

Little Otter Creek

Watershed Plan and Environmental Impact Statement



Prepared in Cooperation with:

Caldwell County Commission

Caldwell County Soil and Water Conservation District

WATERSHED PLAN - ENVIRONMENTAL IMPACT STATEMENT
LITTLE OTTER CREEK
CALDWELL COUNTY, MISSOURI

ABSTRACT:

This document will set forth a plan to provide agricultural water management (rural water supply), improve fish and wildlife habitat, provide recreational opportunities, and reduce flood damages in Caldwell County, Missouri. The recommended plan consists of one multiple-purpose reservoir and development of recreational areas and facilities composed of open spaces, walking trails, picnic areas, riparian forests, wildlife habitat enhancement, restrooms, a boat ramp, and a shelterhouse. Total project costs are \$6,229,500; of which \$3,358,000 will be paid from federal Public Law 83-566 funds and \$2,871,500 from non-federal funds. Project impacts include: rural water supply, recreational development, fish and wildlife habitat enhancement, and flood damage reduction.

This document has been prepared under the authority of the Watershed Protection and Flood Prevention Act, Public Law 83-566, as amended (16 U.S.C. 1001-1008), and in accordance with Section 102(2)(c) of the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 U.S.C. 4321 et seq.).

PREPARED BY THE:

Caldwell County Commission, Missouri
Caldwell County Soil and Water Conservation District
U.S. Department of Agriculture, Natural Resources Conservation Service

FOR ADDITIONAL INFORMATION CONTACT:

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WATERSHED AGREEMENT

BETWEEN THE

Caldwell County Commission

Caldwell County Soil and Water Conservation District

(Referred to herein as Sponsors)

AND THE

Natural Resources Conservation Service,

United States Department of Agriculture

(Referred to herein as NRCS)

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsors for assistance in preparing a plan for works of improvement for the Little Otter Creek Watershed, Caldwell County, Missouri, under the authority of the Watershed Protection and Flood Prevention Act (16 U.S.C. 1001-1008); and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to NRCS; and

Whereas, there has been developed through the cooperative efforts of the Sponsors and NRCS a plan for works of improvement for the Little Otter Creek Watershed, Caldwell County, Missouri, hereinafter referred to as the Watershed Plan-Environmental Impact Statement (EIS), which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through NRCS, and the Sponsors hereby agree on this plan and that the works of improvement for this project will be installed, operated, and maintained in accordance with the terms, conditions, and stipulations provided for in this watershed plan/environmental impact statement and including the following:

REAL PROPERTY:

1. The Sponsors will acquire such real property as will be needed in connection with the works of improvement. The percentages of the real property acquisition costs to be borne by the Sponsors and NRCS are as follows:

Works of Improvement (Structural Measures)	Caldwell County (percent)	NRCS (percent)	Estimated Real Property Costs (dollars)
Multiple-Purpose Reservoir LO-1 Payment to Landowners for Approximately 695 acres	89.3	10.7	1,124,200

The Sponsors agree that all land acquired or improved with Public Law 83-566 financial or credit assistance will not be sold or otherwise disposed of for the evaluated life of the project, except to a public agency which will continue to maintain and operate the development in accordance with the Operation and Maintenance Agreement.

RELOCATION PAYMENTS AND ASSURANCES:

2. The Sponsors hereby agree that they will comply with all policies and procedures of the Uniform Relocation assistance and Real Property Acquisition Policies Act (42 U.S.C. 4601 et. seq. as implemented by 7 C.F.R Part 21) when acquiring real property interests for this federally assisted project. If the Sponsors are legally unable to comply with the real property acquisition requirements of the Act, it agrees that, before any federal financial assistance is furnished, it will provide a statement to that effect, supported by an opinion of the chief legal officer of the state containing a full discussion of the facts and law involved. This statement may be accepted as constituting compliance. In any event, the Sponsors agree that they will reimburse owners for necessary expenses as specified in 7 C.F.R. 21.1006(c) and 21.1007.

The cost of relocation payments in connection with the displacements under the Uniform Act will be shared by the Sponsors and NRCS as follows:

(Structural Measures)	Caldwell County (percent)	NRCS (percent)	Estimated Relocation Payment Costs (dollars)
Relocation Payments	45.0	55.0	51,100

WATER RIGHTS:

3. The Sponsors will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to state law as may be needed in the installation and operation of the works of improvement.

PERMITS:

4. The Sponsors will obtain all necessary federal, state, and local permits required by law, ordinance, or regulation for installation of the works of improvement.

CONSTRUCTION COSTS:

5. The percentages of construction costs for structural measures to be paid by the Sponsors and by NRCS are as follows:

Works of Improvement (Structural Measures)	Caldwell County (percent)	NRCS (percent)	Estimated Construction Costs (dollars)^a
Multiple-Purpose Reservoir LO-1	41.9	58.1	3,058,500
Recreational Facilities	50.0	50.0	303,000
Water Intake Structure	50.0	50.0	300,000
Raw Water Line	50.0	50.0	250,000

a. Includes historic preservation costs.

ENGINEERING SERVICES COSTS:

6. The percentages of the engineering services costs to be borne by the Sponsors and NRCS are as follows:

Works of Improvement (Structural Measures)	Caldwell County (percent)	NRCS (percent)	Estimated Engineering Services Costs (dollars)
Multiple-Purpose Reservoir LO-1 ^a	0.0	100.0	673,000
Recreational Facilities	50.0	50.0	36,000
Water Intake Structure	50.0	50.0	66,000
Raw Water Line	50.0	50.0	55,000

a. Includes construction inspection costs that the Sponsors and NRCS will incur, estimated to be \$25,000 and \$240,000 respectively.

PROJECT ADMINISTRATION:

7. The Sponsors and NRCS will each bear the project administration costs that each incurs, estimated to be \$58,500 and \$254,200, respectively.

OTHER ITEMS:

8. The Sponsors will obtain agreements from owners of not less than 50 percent of the land above the multiple-purpose reservoir. These agreements state that the owners will carry out conservation farm or ranch plans on their land. The Sponsors will ensure that 75 percent of the land upstream of the reservoir is adequately protected before construction of the dam.
9. The Sponsors will encourage landowners and operators to operate and maintain land treatment measures for the protection and improvement of the watershed.
10. The Sponsors agree to participate in and comply with applicable federal floodplain management and flood insurance program policies.
11. The Sponsors will be responsible for the operation, maintenance, and replacement of the works of improvement by actually performing the work or arranging for such work, in accordance with agreements to be entered into prior to issuing invitations to bid for construction work.
12. The costs shown in this plan are preliminary estimates. Final costs to be borne by the parties hereto, will be the actual costs incurred in the installation of the works of improvement.
13. This agreement is not a fund-obligating document. Financial and other assistance to be furnished by NRCS in carrying out the plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.
14. A separate agreement will be entered into between NRCS and the Sponsors before either party initiates work involving funds of the other party. Such agreement will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.
15. This plan may be amended or revised only by mutual agreement of the parties hereto, except that NRCS may de-authorize or terminate funding at any time it determines the Sponsors have failed to comply with the conditions of this agreement. In this case, NRCS shall notify the Sponsors in writing of the determination and the reasons for the de-authorization of project funding, together with the effective date. Payments made to the Sponsors or recoveries by NRCS shall be in accord with the legal rights and liabilities of the parties when project funding has been de-authorized. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between NRCS and the Sponsors having specific responsibilities for the measure involved.

16. The program or activities conducted under this agreement will be in compliance with the nondiscrimination provisions contained in the Titles VI and VII of the Civil Rights Act of 1964, as amended; the Civil Rights Restoration Act of 1987 (Public Law 100-259); and other nondiscrimination statutes: namely, Section 504 of the Rehabilitation Act of 1973, Title IX of the Education Amendments of 1972, the Age Discrimination Act of 1975, and American's With Disabilities Act of 1990. They will also be in accordance with regulations of the Secretary of Agriculture (7 CFR-15, Subparts A & B), which provide that no person in the United States shall on the grounds of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving federal financial assistance from the U.S. Department of Agriculture or any agency thereof.
17. **Certification Regarding Drug-Free Workplace Requirements (7 CFR 3017, Subpart F).**

By signing this watershed agreement, the Sponsors are providing the certification set out below. If it is later determined that the Sponsor knowingly rendered a false certification, or otherwise violated the requirements of the Drug-Free Workplace Act, the NRCS, in addition to any other remedies available to the Federal Government, may take action authorized under the Drug-Free Workplace Act.

Controlled substance means a controlled substance in Schedules I through V of the Controlled Substances Act (21 U.S.C. 812) and as further defined by regulation (21 CFR 1308.11 through 1308.15);

Conviction means a finding of (including pleas of nolo contendere) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the federal or state criminal drug statutes;

Criminal drug statute means a federal or non-federal criminal statute involving the manufacturing, distribution, dispensing, use, or possession of any controlled substance;

Employee means the employee of a grantee directly engaged in the performance of work under a grant, including: (i) all direct charge employees; (ii) all indirect charge employees unless their impact or involvement is insignificant to the performance of the grant; and, (iii) temporary personnel and consultants who are directly engaged in the performance of work under the grant and who are on the grantee's payroll. This definition does not include workers not on the payroll of the grantee (e.g., volunteers, even if used to meet a matching requirement; consultants or independent contractors not on the grantees' payroll; or employees of subrecipients or subcontractors in covered workplaces).

Certification:

A. The Sponsors certify that they will or will continue to provide a drug-free workplace by:

- (1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantees workplace and specifying the actions that will be taken against employees for violation of such prohibition;
- (2) Establishing an ongoing drug-free awareness program to inform employees about:
 - (a) The danger of drug abuse in the workplace;
 - (b) The grantee's policy of maintaining a drug-free workplace;
 - (c) Any available drug counseling, rehabilitation, and employee assistance programs; and
 - (d) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.
- (3) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (1);
- (4) Notifying the employee in the statement required by paragraph (1) that, as a condition of employment under the grant, the employee will:
 - (a) Abide by the terms of the statement; and
 - (b) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction.
- (5) Notifying the NRCS in writing, within ten calendar days after receiving notice under paragraph (4)(b) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the federal agency has designated a central point for the receipt of such notices. Notice shall include the identification number(s) of each affected grant;
- (6) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (4)(b), with respect to any employee who is so convicted:
 - (a) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or
 - (b) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a federal, state, or local health, law enforcement, or other appropriate agency.

- (7) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (1), (2), (3), (4), (5), and (6).
- B. The Sponsors may provide a list of the site(s) for the performance of work done in connection with a specific project or other agreement.
- C. Agencies shall keep the original of all disclosure reports in the official files of the agency.
18. Certification Regarding Lobbying (7 CFR 3018)(applicable if this agreement exceeds \$100,000).
- (1) The Sponsors certify to the best of their knowledge and belief, that:
- (a) No federal appropriated funds have been paid or will be paid, by or on behalf of the Sponsors, to any person for influencing or attempting to influence an officer or employee of an agency, member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.
 - (b) If any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form - LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
 - (c) The Sponsors shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.
- (2) This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.
19. Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transactions (7 CFR 3017).
- (1) The Sponsors certify to the best of their knowledge and belief, that they and their principals:

- (a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any federal department or agency;
 - (b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, state, or local) transaction or contract under a public transaction; violation of federal or state antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
 - (c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (federal, state, or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and
 - (d) Have not within a three-year period preceding this application/proposal had one or more public transactions (federal, state, or local) terminated for cause of default.
- (2) Where the primary Sponsors are unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this agreement.

Caldwell County Commission

49 East Main
Address

Kingston Mo 64650
City State Zip Code

Tax I. D. # 44-6000456

The signing of this plan was authorized by a resolution of the governing body of Caldwell County, Missouri adopted at a meeting held May 12, 2003

49 East Main
Address

Kingston, Mo 64650
City State Zip Code

Dale Hartby
By

Presiding Comm.
Title

May 23 03
Date

Shari L. Lee
County Clerk

May 23, 2003
Date

Caldwell County Soil and Water Conservation District

8475 SE Red Brick Rd
Address

Cowgill MO 64637
City State Zip Code

Tax I. D. # 12601403

The signing of this plan was authorized by a resolution of the governing body of the Caldwell County Soil and Water Conservation District adopted at a meeting held on May 14, 2003

23 W. Main
Address

Kingston Mo 64650
City State Zip Code

Ken McElmer
By

Chairman
Title

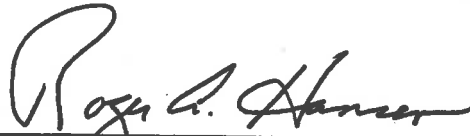
MAY 23, 2003
Date

Kevin Hansen
Secretary of the Board

May 23, 2003
Date

**Natural Resources Conservation Service
United States Department of Agriculture**

Approved by:



Roger A. Hansen, State Conservationist

5/23/03

Date

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SUMMARY OF WATERSHED PLAN - ENVIRONMENTAL IMPACT STATEMENT

PROJECT NAME

Little Otter Creek Watershed

LOCATION

Caldwell County, Missouri. (Refer to Little Otter Creek Watershed Map, Appendix F)

SPONSORS

Caldwell County Commission

Caldwell County Soil and Water Conservation District

DESCRIPTION OF RECOMMENDED PLAN

The recommended plan consists of installation of one multiple-purpose reservoir and development of basic facilities for recreational use. The multiple-purpose reservoir will provide locally-controlled agricultural water management (rural water supply); fish and wildlife habitat enhancement; recreational development; and flood prevention.

RESOURCE INFORMATION

Watershed Size	6,323 acres
Caldwell County Population	8,969
Watershed Population	120
Watershed Land Ownership	
Private	98 percent
Federal, State, Local Government	2 percent
Number of Farms	69
Average Farm Size, Caldwell County	142 acres
Prime Farmland	2,365 acres
Number of Minority Farmers	0
Number of Limited Resource Farmers	15
Floodplain -100-year (Little Otter Creek)	476 acres
Floodplain -100-year (Little Otter Creek & spill over into Cottonwood Creek Watershed)	674 acres
Floodplain - 100-year (Below Reservoir LO-1 - Little Otter and Cottonwood Creeks)	599 acres

Highly Erodible Land 3,518 acres

Wetlands 47 acres

Endangered Species The Indiana bat may occur in the watershed, but is not likely to be adversely impacted by the project. Guidelines developed by USFWS for the conservation of the bat will be followed. MDC sampling collected no Topeka shiners. All indications are that the Topeka shiner will not be affected by the proposed project.

Cultural Resources Archaeological or historic resources are not expected to be adversely impacted by project activities. More detailed evaluations will be conducted if archaeological or historic issues surface during the final design and construction phases.

LAND USE/LAND COVER

Land Use/Land Cover	Upland	Floodplain ^a	Total
acres.....		
Watershed			
Cropland	1,397	385	1,782
Pasture	720	39	759
Hayland	544	26	570
Other Grassland, Including CRP ^b	1,674	123	1,797
Forestland	542	320	862
Brush	96	5	101
Water	108	3	111
Other (farmsteads, roads)	298	43	341
TOTAL	5,379	944	6,323

a. Based on frequently and occasionally flooded soils

b. Conservation Reserve Program

LAND USE/LAND COVER CHANGES

Installation of Little Otter Creek Reservoir LO-1 will inundate these acreages: 70 of cropland, 35 of pasture, 14 of hay, 97 of other grasslands (including 83 of CRP), 139 of forest, 3 of brush, and 4 of farmsteads and roads for a total of 362 acres. An additional 62 acres comprised largely of forest and other grassland fall between the permanent pool and auxiliary spillway elevations. These areas would become seasonally wet with the structure. NRCS will recommend that the Sponsors give consideration to acquiring additional landrights to cover an area to the top of dam elevation. These additional real property rights would provide an additional 72 acres of vegetative buffer and mitigation areas.

Caldwell County, and specifically the Little Otter Creek Watershed, experienced an insignificant population and economic growth during the decade of the 1990s. Significant land use changes in the Little Otter Creek Watershed due to residential, commercial, or industrial development are not expected. Residential housing on small acreages may increase due to development along the Interstate 35 corridor, the recent upgrade of U.S. Highway 36 to four lanes, potential increases in jobs west of Caldwell County, and increased recreation opportunities through the P.L.-566 project. Major changes in land use for agricultural production are not expected.

PROJECT BENEFICIARY PROFILE

	Per Capita Income	Unemployment ^b	Age - Over 65 Years
Caldwell County	\$17,394 ^a	4.7%	17.0%
Missouri	\$27,186 ^b	3.5%	13.5%
USA	\$29,451 ^b	3.7%	12.4%

a. 1999 U.S. Department of Commerce

b. 2000 Missouri Department of Economic Development

There are 7 towns in Caldwell County. They are Polo with a population of 582, Hamilton – population 1,813, Kingston – population 287, Braymer – population 910, Cowgill – population 247, Breckenridge – population 454, and Kidder – population 271. The total population of these towns is 4,564 according to the 2000 census. These towns have their own water supply and treatment facilities. Currently, Hamilton has a water supply that is adequate, during normal conditions, to serve its population and supply water to a portion of the rural customers. However, supplies are inadequate during dry periods and drought conditions and are not projected to meet future needs. Many county residents have no reliable water supply on site at all. They are forced to purchase and haul water for storage at their houses or businesses (Allgeier, Martin, and Associates, 1992).

According to the 2000 U.S. Census, there are 8,969 people in Caldwell County.

	<u>Caldwell County</u>	<u>Little Otter Creek Watershed</u>	<u>Missouri</u>	<u>U.S.</u>
Population	8,969	120	5,595,211	281,421,906
Population over 65	17.0%	---	13.5%	12.4%
White	98.5%	99.1%	84.8%	75.1%
Hispanic or Latino	0.1%	---	2.1%	12.5%
African American	0.1%	---	11.2%	12.3%
American Indian	0.3%	---	0.4%	0.9%
Asian	0.1%	---	1.1%	3.6%
Other	1.0%	0.9%	1.0%	5.5%

PROBLEM IDENTIFICATION - PROJECT AREA

- Inadequate and undependable rural water supply system for the residents of Caldwell County.
- \$62,900 average annual flood damages to crops, pastures, fences, roads, and bridges.
- Decreased farm income and increased maintenance due to flooding on 674 acres.
- Limited public water-based recreational facilities within 25 miles of the project area.

PROJECT PURPOSES

- To provide an adequate, dependable, locally-controlled water supply system for the rural areas and municipalities within Caldwell County.
- To improve recreational opportunities by providing a site for fishing, hiking, picnicking, and nature studies.
- To reduce flood damages in the downstream areas of the Little Otter Creek floodplain.

ALTERNATIVE PLANS CONSIDERED

Alternative 1 (National Economic Development Plan - Recommended)

- One multiple-purpose reservoir
- Agricultural water management (rural water supply)
- Fish and wildlife habitat enhancement and recreational development
- Flood control

Alternative 2 (No Action Alternative)

- No Action

PRINCIPAL PROJECT MEASURES

Structural

The primary structural measure is one multiple-purpose reservoir with a drainage area of 4,825 acres. The beneficial use pool will be 362 acres and the floodwater retarding pool will be 424 acres. Open space in the area acquired around the reservoir will be developed into recreational, natural, and wildlife areas.

INSTALLATION COSTS OVER 4 YEARS**TABLE A
PROJECT COSTS ^a**

	P.L. 83-566		Sponsors		Total
	(dollars)	(%)	(dollars)	(%)	(dollars)
STRUCTURAL MEASURES					
Multiple-Purpose Reservoir	2,819,000	55	2,332,500	45	5,151,500
Recreational Facilities	181,500	50	181,500	50	363,000
Water Intake Tower	195,000	50	195,000	50	390,000
Raw Water Line	162,500	50	162,500	50	325,000
TOTAL	3,358,000	54	2,871,500	46	6,229,500

a. Price Base September 2001

PROJECT BENEFITS**TABLE B
AVERAGE ANNUAL BENEFITS ^a**

Benefits	Dollars^a	Reduction
Flood Damage Reduction	60,600	96%
Rural Water Management	245,200	-----
Recreational	266,200	-----
Total Project Benefits	572,000	

a. Price Base September 2001

OTHER PROJECT BENEFITS

1. Improved quality of life and potential for increased economic development as a result of the installation of an adequate and dependable water supply system.
2. The 362-acre multiple-purpose reservoir will provide approximately 60,000 annual user days for fishing.
3. Much of the acquired land, adjacent to the reservoir, will revert to natural vegetative growth creating a natural filter for sediment, nutrients, animal waste, and pesticides. Consequently, water quality will be protected in the reservoir and improved in downstream areas of Little Otter Creek.

4. The multiple-purpose reservoir will exhibit a high trap efficiency that will reduce the amounts of sediment delivered to downstream waters.

ENVIRONMENTAL VALUES CHANGED

Community Effects

Within Caldwell County, flood damages in the lower reaches of Little Otter Creek will be reduced by 96 percent. Sediment delivered to these lower reaches will be significantly reduced. Costs to the community for maintenance and clean up following flood events will be reduced. An adequate and dependable water supply system and increased recreational opportunities will improve the quality of life within the area.

Disruption to daily traffic, mail delivery, emergency services, and other vehicle movement will be reduced as flooding is reduced. Floodplain residents will be relieved of the fears associated with flood events and the emotional and economic stresses involved with flood recovery and clean up.

Recreation

The reservoir and recreational facilities will provide public opportunities for fishing, walking/biking, picnicking, family and social events, bird watching, and observing wildlife.

Water Quality

The reservoir will trap sediment, nutrients, pathogens and metals that might otherwise have traveled downstream. As such, implementation of the recommended plan is expected to have a positive effect on the water quality in Little Otter Creek.

Land Treatment

The 319-acre mitigation area surrounding the reservoir will provide filtering benefits for many of the potential agricultural non-point pollutants. Existing federal and state financial, technical and educational assistance programs will be used to help land users apply conservation and environmentally protective agronomic practices. Installation of the reservoir will increase awareness of water quality hazards and encourage use of voluntary environmental protection programs. This will increase land treatment practices and have a positive effect on water quality in the watershed. Seventy-five percent of the land above the planned reservoir must have erosion adequately controlled in order to begin construction.

Wildlife Habitat

Wildlife habitat within the project area will be improved through wetland and wildlife habitat development on mitigation areas adjacent to the multiple-purpose reservoir LO-1. NRCS will develop a mitigation plan in coordination with MDC, USFWS, other appropriate state and federal personnel, and the project Sponsors. The mitigation areas will adequately compensate for the various habitats impacted and emphasize the native species that require these habitat types.

Stream Resources

Little Otter Creek is a very good quality north Missouri stream that supports a good fish community. Approximately 1.8 miles of 4th order, 1.4 miles of 3rd order, and 0.5 miles of 2nd order stream will be inundated. This 3.7 miles of stream will be replaced by the 362-acre reservoir. Approximately 3.8 miles of 4th order stream between the reservoir outlet and the confluence with Otter Creek will experience an altered flow regime. A low flow port will be installed in the principal spillway inlet tower to augment stream flows. Releases from the reservoir will, as nearly as possible, replicate natural baseflow conditions. Flow recommendations will be developed during mitigation planning through consultation between the appropriate state and federal personnel and the project Sponsors.

Consultations with the U.S. Fish and Wildlife Service (USFWS) and the Missouri Department of Conservation (MDC) concerning proposed modifications along Little Otter Creek were conducted during the planning process and plan preparation. The consultation process is outlined in Appendix E, Investigations and Analyses. NRCS will continue consultations with the USFWS, MDC, other appropriate state and federal personnel, and project Sponsors concerning mitigation for the loss of or impact to stream habitat caused by this project. Mitigation measures will be agreed to prior to issuance of the necessary project permits and prior to the start of construction activities.

Wetlands

There will be no net loss of wetlands as a result of project activities. Wetlands will be created in the shallow water areas in the upper ends, as well as other areas of the pool to mitigate for impacted wetlands. An estimated 109 acres of wetlands will be created in the shallow areas of the reservoir permanent pool and an additional 62 acres in the temporary pool. In addition, detention basins above and below the reservoir will be investigated.

Endangered Species

Historically, the federally listed endangered Topeka shiner occurred in reaches of Shoal Creek. Little Otter Creek flows into Otter Creek, which in turn flows into Shoal Creek. The Missouri Department of Conservation conducted a survey of the fish community to determine the presence of the Topeka shiner. No Topeka shiners were collected. Therefore, all indications are that the Topeka shiner will not be affected by the proposed project.

The Indiana bat (*Myotis sodalis*) may occur in the watershed. In order to avoid adverse impacts to the Indiana bat, the guidelines developed by the U.S. Fish and Wildlife Service for the conservation of the Indiana bat will be followed as per NRCS Biology Technical Note 17.

Cultural Resources

The cultural resources review and survey of the watershed found no significant cultural resources to be present. No known archaeological or historic resources will be adversely impacted by project activities. More detailed evaluations will be conducted if archaeological or historic issues surface during the final design and construction phases.

Social Acceptability

The voters of Caldwell County approved a 0.5 percent sales tax on August 6, 2002, to assist in funding the local match for project installation. All watershed plan components are acceptable to the Sponsors and to a majority of the Caldwell County residents who provided feedback.

MITIGATION FEATURES

Approximately 102 units of wildlife habitat will be lost on cropland and upland and bottomland hardwood acreage that will be converted to the permanent pool. Refer to Appendix E, Investigations and Analyses, Biology section for methodology/species used to determine wildlife habitat units. The 102 habitat units lost will be mitigated with 102 habitat units on a 319-acre mitigation area adjacent to the permanent pool. When obtaining mitigation acres around the reservoir, credit will be given for the acres in the required buffer zone and the temporary pool area. Areas obtained for the mitigation area will be maintained in a natural state if the existing vegetation consists of wildlife friendly species and can be managed to meet the goal of a 0.80 HSI for bobwhite quail. In areas without wildlife friendly species, grasses, trees, and/or shrubs will be planted based upon recommendations of appropriate federal and state personnel. Grazing will be prohibited. Mowing will be allowed where necessary to enhance recreational opportunities or as a method to enhance wildlife habitat when approved by the appropriate MDC and/or USFWS personnel.

Timber management will be allowed based on the recommendations of a MDC forester. Trees will not be removed from the permanent or temporary pool areas except as needed for excavation of borrow materials required for construction of the reservoir components. Full credit for the compensation acres could begin at the time the land is acquired. Mitigation areas will be fenced, where necessary, to exclude livestock. Prescribed burning that is consistent with wildlife habitat enhancement may be performed. A NRCS approved prescribed burn plan should be followed. Haying will only be allowed after July 15 if approved, annually, by a NRCS or MDC biologist, and if the biologist determines that use of these practices will maximize wildlife habitat.

Mitigation for the 3.7 miles of stream lost to reservoir inundation will be addressed through the U.S. Army Corps of Engineers 404 and Missouri Department of Natural Resources 401 permit process. Mitigation measures could include, but are not limited to, long term easements on riparian areas in the watershed and/or cash payments to the Stream Stewardship Fund. Mitigation measures will be agreed to prior to issuance of the necessary project permits and prior to the start of construction activities.

A low flow port will be installed in the principal spillway inlet tower to augment stream flows. Releases from the reservoir will, as nearly as possible, replicate natural baseflow conditions. Flow recommendations will be developed through consultation between appropriate federal and state personnel and the Sponsors.

MAJOR CONCLUSION

The Little Otter Creek Watershed project will have a major beneficial effect on the problems of an inadequate, undependable, water supply, lack of recreational opportunities, and floodwater damages in the lower stream reaches. A reliable, dependable, locally-controlled, water supply system will be developed. Fisheries and wildlife habitats, as well as recreational opportunities, will be enhanced and water quality will be improved. Flood damages to roads, bridges, fences, and cropland will be significantly reduced.

The project is not expected to affect threatened or endangered species. No known archaeological or historic resources will be adversely impacted by project activities.

AREAS OF CONTROVERSY

The planning process included public meetings, scoping meetings, formation of a steering committee comprised of a diverse group of local residents, print media coverage of project activities, and coordination with relevant agencies and groups. No significant unresolved issues or controversies remain.

INTRODUCTION

The Watershed Plan and Environmental Impact Statement for the Little Otter Creek Watershed project are combined into this single document. The purpose of the project is to provide an adequate, dependable, locally controlled, rural water supply (agricultural water management); increase recreational opportunities; enhance fish and wildlife habitats; and provide flood prevention. The project area is located within Caldwell County, Missouri. Plan elements include development of a multiple-purpose reservoir, water intake tower, raw water line, and basic recreational facilities. This plan makes public the expected impacts of the project and provides the basis for authorizing federal assistance for local implementation. Local support for this project is evidenced by the August 6, 2002 vote approving a county-wide sales tax to assist in funding the project.

Project Sponsors:

Caldwell County Commission

Caldwell County Soil and Water Conservation District

The Sponsors were assisted in the development of this plan by the United States Department of Agriculture (USDA) - Natural Resources Conservation Service (NRCS).

This plan was prepared under authority of the Watershed Protection and Flood Prevention Act, Public Law 83-566, as amended (16 U.S.C. 1001-1008), and in accordance with Section 102(2)(c) of the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 U.S.C. 4321 et seq.) and the National Historic Preservation Act of 1966, as amended. Responsibility for compliance with the National Environmental Policy Act rests with the Natural Resources Conservation Service (NRCS).

All information and data, except as otherwise noted, were collected during watershed planning investigations conducted by the Natural Resources Conservation Service (NRCS).

PROJECT SETTING

WATERSHED SIZE 6,323 acres

LOCATION

Little Otter Creek Watershed is located in Caldwell County in northwest Missouri. Little Otter Creek originates approximately 2 miles east of Hamilton, Missouri, and flows south-southeast to its outlet at Otter Creek about 1 mile southeast of New York, Missouri.

SOCIAL AND ECONOMIC CONDITIONS

Little Otter Creek Watershed lies entirely within Caldwell County, Missouri. Caldwell County is approximately 30 miles northeast of Kansas City, Missouri. The county is primarily an agricultural, rural area with 845 farms of which 69 are in Little Otter Creek Watershed. There are about 275,000 acres in the county and 6,323 acres in the watershed. The county is 98 percent privately owned land with 2 percent in federal, state, or local government ownership. Interstate Highway I-35 runs north and south immediately west of the county. U.S. Highway 36 traverses the watershed east and west at the northern end of the county. There are no incorporated towns in the watershed.

According to the United States Bureau of Census' 2000 census, the population of Caldwell County was 8,969 and the watershed population was 120 (using the nearest spatial approximation of the watershed via census blocks). Seventeen percent of Caldwell County's population is over the age of 65, compared to 13.5% for the state of Missouri and 12.4% for the nation. Caldwell County's population is 98.5 percent white, 0.3 percent American Indian, 0.1 percent African American, 0.1 percent Asian, and 1.0 percent other.

As reported by the Missouri Department of Economic Development (DED), Caldwell County had a labor force of 3,100 as of June 2000. Unemployment in the county was 145 (4.7%) that year, compared to 3.5% statewide and 3.7% nationally. Caldwell County's per capita income is \$17,394. Per capita income for Missouri is \$27,186, while the national figure is \$29,451.

The largest employment sector in Caldwell County is government, employing 670 of 1,462 people (46%) working in the county (DED, 2000). Other employment sectors and their percent of workforce are: retail trade, 13%; construction, 10%; services, 10%; finance, insurance, and real estate, 6%; transportation and public utilities, 5%; wholesale trade, 4%; manufacturing, 4%; and agriculture, forestry, and fishing, 2%.

There are no anticipated major socio-political factors that will influence major changes in land use or management of the soil, water, air, plant, or animal resources within the watershed.

TOPOGRAPHY AND SOILS

The watershed lies within Major Land Resource Area 109 – Iowa and Missouri Heavy Till Plain. Upland topography consists of nearly level to sloping, rounded ridgetops and gently sloping to moderately steep sideslopes. Nearly level to flat floodplain areas are located along the mainstream channel of Little Otter Creek and its tributaries. Local relief is approximately 73 meters (239 feet) with elevations ranging from 300 meters (984 feet) National Geodetic Vertical Datum (NGVD) at the northwest portion of the watershed to 227 meters (745 feet) at the watershed outlet.

The published soil survey of Caldwell County (USDA-SCS, April 1974) lists the following soil associations within the watershed boundaries:

1. Lagonda-Grundy: Lagonda soils are on ridges, the upper parts of hillsides, and around the heads of small drainageways. They formed in loess over glacial till. Grundy soils occupy the higher parts of high, rounded ridges and formed in loess deposits. Slopes range from 2 to 9 percent. Minor soils in this association include: Lamoni, Adair, Armster, Kennebec, Blackoar, and Zook.
2. Armster-Lineville: Armster soils occupy the lower parts of hillsides and formed in glacial till. Lineville soils are on ridges and upper hillsides in uplands and formed in loess overlying glacial till. Slopes range from 2 to 20 percent. Minor soils in this association include: Ladoga, Sampsel, Snead, Greenton, Rock land, Kennebec, Zook, Moniteau, and Nevin.
3. Sampsel-Greenton-Snead: Sampsel soils are mostly on the lower part of hillsides and formed in residuum weathered from shales. Greenton soils are on hillsides and the end of ridges on uplands and formed in residuum from interbedded shales and limestones. Snead soils are on hillsides and formed on weathered materials from interbedded shales and limestones. Slopes range from 2 to 20 percent. Minor soils in the association include: Lagonda, Armster, Lineville, Rock land, and Kennebec.
4. Kennebec-Zook: Kennebec soils are on floodplains and gently sloping footslopes and formed in silty alluvium. Zook soils are in swales, old stream channels, and other depressional areas on bottomlands and formed in fine textured alluvium. Slopes are level to nearly level. Minor soils in the association include: Blackoar, Colo, Nevin, Moniteau, Armster, and Sampsel.

GEOLOGY

The Little Otter Creek Watershed is underlain by Pennsylvanian age, interbedded limestones and shales belonging to the Kansas City group. These bedrock units are blanketed with soils formed from limestones, shales, loess, glacial till, and/or alluvium. Numerous bedrock outcroppings are present in the creek bottom, streambanks, tributaries, gullies, and valley sideslopes. Stratigraphic units identified in outcrop include the Winterset limestone member, the Bethany Falls limestone member, and the Hushpuckney shale member. Core drilling of the proposed water supply

reservoir penetrated other members of the Cherryvale, Dennis, Swope, Ladore, and Hertha formations. An abandoned quarry, located ½ mile downstream of the proposed centerline, exposes some of these units.

Bedrock is shallow at the centerline of the proposed structure and in the pool area. Core drilling and backhoe pits encountered bedrock at 12 feet below the floodplain surface of Little Otter Creek. Valleys are filled with alluvial materials comprised of gravels, sands, silts, and clays. Field investigations of outcrops revealed 4 bedrock joint sets. These joints, which are cracks or planar features that divide rock into blocks, are oriented vertically and trend N to North 15°W, N30°E to N50°E, N40°W to N65°W, and N60°E to N80°E. These joint sets, which are potential paths for the movement of water, were investigated during core drilling operations. Preliminary drilling and pressure testing suggests that the upper few feet of the bedrock is weathered and fractured and can potentially transmit significant amounts of water. Deeper, unweathered bedrock appears sound, unfractured and essentially impermeable.

LAND USE/LAND COVER

TABLE C
WATERSHED LAND USE/LAND COVER AND STATUS OF TREATMENT

Present Conditions

Land Use	Upland				Floodplain ^d				Total	Percent of Watershed
	Treated ^b	Not Treated	Undet	Total	Treated	Not Treated	Undet	Total		
Cropland	86 ^c	1,256	55	1,397	311	40	34	385	1,782	28%
Pasture	632	26	62	720	30	1	8	39	759	12%
Hayland	507	37	0	544	24	2	0	26	570	9%
Other grass, including CRP	1,364	0	310	1,674	100	0	23	123	1,797	28%
Forestland	0	0	542	542	0	0	320	320	862	14%
Brush	0	0	96	96	0	0	5	5	101	2%
Other ^a	220	0	186	406	3	0	43	46	452	7%
Totals	2,809	1,319	1,251	5,379	468	43	433	944	6,323	100 %

a. Other land includes water, farmsteads, roads, and railways.

b. "Treated" areas are fields for which sheet and rill erosion is less than the T value of the field's dominant soil map unit. For "not treated" areas, USLE > T. Areas are "undet" (undetermined) if the USLEs were not calculated in field office case-files.

c. All values in acres, unless otherwise noted as a percent.

d. Acreages used here were determined based on frequent and occasionally flooded soils.

The percentage of land treatment in the watershed can be improved, particularly with conservation practices on cropland. Soil erosion affects production, economics, water quality, and the environment in general. The watershed has nearly 1,500 acres currently in the USDA-Conservation Reserve Program (CRP). CRP expiration dates range from 2005 to 2015.

STREAM RESOURCES

Little Otter Creek, which drains an area of 6,323 acres, is the mainstem stream within the watershed. It is a good quality 4th order north Missouri stream that supports a very good fish community. In May 2001, twelve species of fish were collected from Little Otter Creek by Missouri Department of Conservation (MDC) personnel. These included: Central Stoneroller, Red Shiner, Redfin Shiner, Golden Shiner, Bigmouth Shiner, Bluntnose Minnow, Fathead Minnow, Creek Chub, Black Bullhead, Green Sunfish, Bluegill, and Johnny Darter. All of these are common species of fish. The Bluntnose Minnow, Fathead Minnow, Black Bullhead, Green Sunfish, and Bluegill are very tolerant species. The Redfin Shiner and Johnny Darter were the most sensitive fish found in Little Otter Creek.

Channel substrates are generally stable and consist of sand, gravel, cobble, and bedrock. The majority of the riparian corridor along Little Otter Creek is in good condition, although it is narrow in some locations. It is comprised primarily of middle-aged trees with an understory of shrubs, weeds, and grass. The roots of the trees and understory help to stabilize much of the creek's streambanks. A 1.4 mile reach of the creek, just upstream of the proposed dam location, does exhibit moderate to severe streambank erosion. This reach produces 65% of the total streambank erosion within the watershed.

Aquatic GAP lists 28 species of fish that have been collected from similar streams in the Plains-Grand-Chariton Ecological Drainage Unit (EDU) and would be expected to occur in Little Otter Creek. Fourteen of the 16 species occurring in the Plains-Grand-Chariton EDU that were not collected in Little Otter Creek are fairly common species. Two uncommon species, the Stonecat and Topeka Shiner, occur in this EDU, but were not collected in Little Otter Creek.

Based on Aquatic GAP, Little Otter Creek is classified as Headwaters or Creek and has low to medium relative gradient. There are only 2% of the streams in the Plains-Grand-Chariton EDU with similar characteristics as Little Otter Creek. Thus, Little Otter Creek is a relatively rare type of stream. Little Otter Creek's Aquatic GAP Watershed Classification is also relatively rare in the Plain-Grand-Chariton EDU. It is described as "silty clay loams of low infiltration capacity in relatively rugged terrain with no springs. Sedimentation can be an issue in this type of watershed".

CULTURAL RESOURCES

Archaeological evidence is that humans have occupied the Caldwell County area for at least the last 10,000 years. While no archaeological sites have been recorded within the Little Otter Creek Watershed, prehistoric sites have been recorded along major drainages in the area. European settlers first moving into Caldwell County in the early 1800s noted that the Iowas and Kickapoos

used the area as “hunting grounds”. The county of Caldwell was organized in 1836, with a county seat at Far West. The population of the county quickly increased to nearly 7,000 as the county became the home of the Mormons. Tensions between the Mormon and non-Mormon populations increased, culminating in late 1838, in a period known locally as the “Mormon War”, and the movement of most of the Mormons from the county.

The National Register of Historic Places lists two sites in Caldwell County – the Caldwell County Courthouse and the old town site of Far West. Neither are within the watershed boundaries.

WATER QUALITY

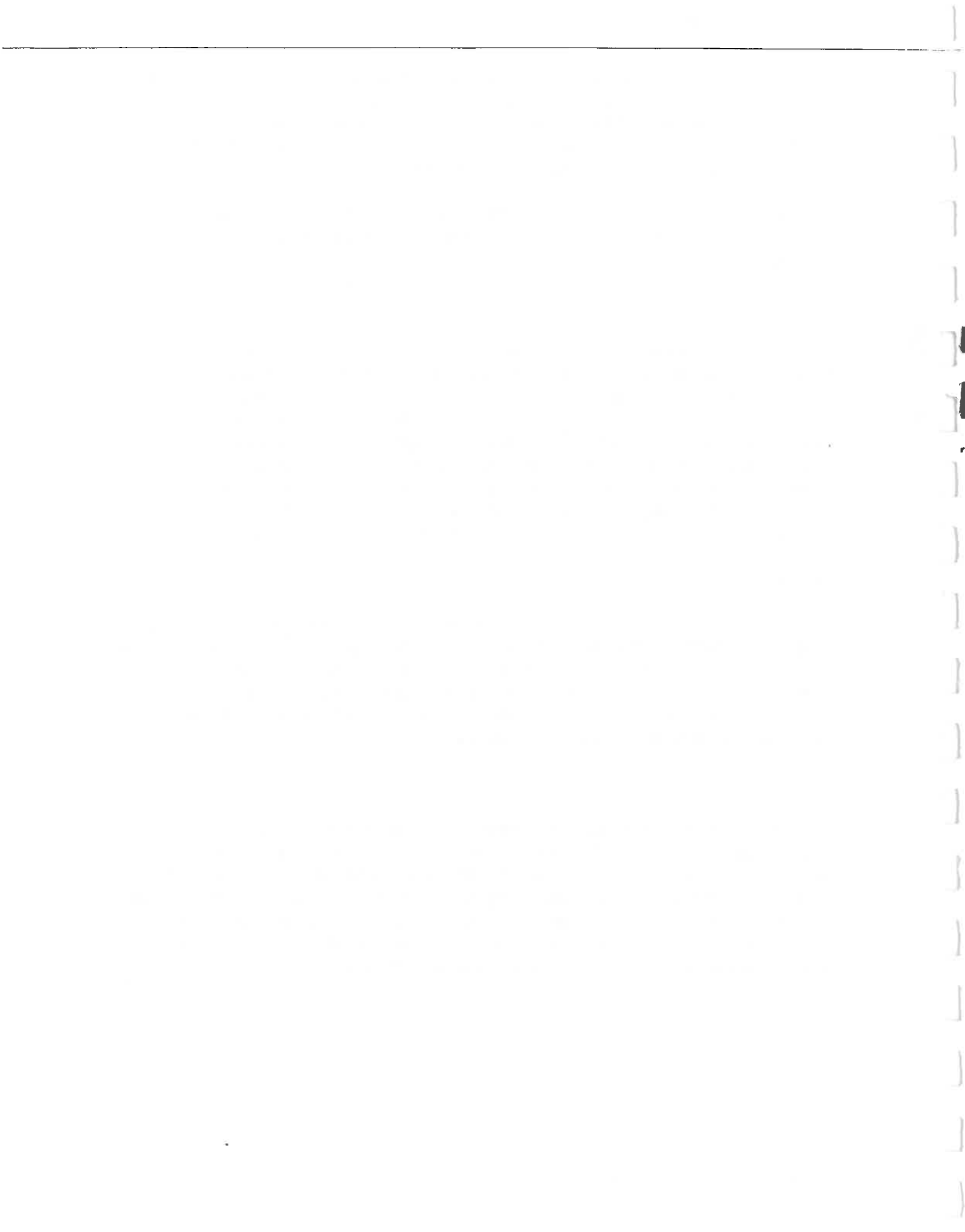
Little Otter Creek is absent from Missouri’s list of impaired waters under section 303(d) of the Clean Water Act. Discussions with state government officials uncovered no awareness of leaking underground storage tanks, hazardous waste disposal sites, permitted landfills, treatment, storage and disposal (TSD) facilities, Superfund sites, or permitted wastewater treatment facilities in the Little Otter Creek Watershed. U.S. Highway 36 poses a risk of water pollution by deicers, automotive and combustion by-products and the risk of a release due to a transportation-related hazardous materials incident. Though agricultural non-point source pollution has not been associated with any impairment to water quality in Little Otter Creek, cropland or pasture mismanagement in close proximity to the reservoir poses a risk to water quality.

WETLANDS

Wetland habitat quality has been reduced as wetlands within the watershed have been impacted by agricultural activity. The National Wetland Inventory identified 47 acres of natural wetlands within the watershed, including 38 acres of seasonally flooded forest. The remaining 9 acres are small patches of emergent wetlands in pastures. The National Wetland Inventory and the Farm Bill Wetland Inventory identified 16.58 acres of natural wetlands within the proposed top of dam elevation of the project area (refer to Appendix D).

CLIMATE

The Little Otter Creek Watershed has a humid, sub-continental climate. The area is subject to large changes of temperature from season to season. On average, January is the coldest month and July is the hottest. The fall and winter months have the largest day-to-day changes. The average time interval between the last spring freeze and the first freeze in the fall is 179 days (USDA-SCS, April 1974). The annual mean temperature is 51.4° Fahrenheit. Average annual total rainfall is 35.8 inches (worldclimate.com). Most precipitation occurs during the period April through September. Average annual snowfall is 22.3 inches.



WATERSHED PROBLEMS AND OPPORTUNITIES

Significant land and water resource problems are present in the Little Otter Creek project area. These problems are interrelated and adversely effect other resources or uses of resources, such as fish and wildlife habitat, recreation, and cropland production. Major problems include an inadequate rural water supply system for the residents of Caldwell County, lack of public water-based recreational facilities and wildlife habitat areas, and flooding.

AGRICULTURAL WATER MANAGEMENT (RURAL WATER SUPPLY)

The lack of a dependable, locally-controlled source of water has long been a concern for Caldwell County. In fact, the issues of reservoir construction and public drinking water supplies have been the subjects of numerous engineering reports over the past 40 years. Current sources of water include both groundwater and surface water supplies.

Private water supplies are unavailable to a number of residents either because groundwater does not exist at a reasonable depth, or because what does exist is unsuitable for use as potable water. As a result, many residents have no reliable water supply on site and are forced to purchase and haul water (Algeier, Martin, and Associates, 1992). Generally, water from wells in the area is highly mineralized, with unacceptable levels of chlorides and dissolved solids. Typical yields from domestic wells are less than 15 gallons per minute. During periods of drought, water levels in these wells drop or dry up. More favorable aquifers, in regard to quantity and quality, are within the ancient sand and gravel filled channels and valleys of glacial streams. The Missouri Geologic Survey has mapped these glacial drift filled valleys. None exist within Caldwell County.

Public Water Supply District No. 3, which includes the Little Otter Creek Watershed, is in serious need of good quality, reliable water service from a centralized public water supply (Algeier, Martin, and Associates, 1992). Such service is necessary for the economic and physical well being of Caldwell County residents. Availability of a reliable supply of potable water is extremely limited. Although several public water systems exist, they lack the ability to expand sufficiently to alleviate the problem to any meaningful degree (Allgeier, Martin, and Associates, 1992).

The cities of Breckenridge and Hamilton use surface water reservoirs as a source of drinking water. However, both are inadequate to meet present needs during periods of prolonged dry weather. Breckenridge supplements their system with a well. Hamilton has installed a pump system to draw water from a nearby stream. This has proven to be a high maintenance system to operate. The cities of Polo, Kingston, Cowgill, and Braymer each operate their own systems. All of these are limited in capacity.

Allstate Consultants, 2002, has provided the following total daily water demands (gallons per day) for rural communities in Caldwell County: Braymer – 136,000, Kingston – 38,950, Hamilton – 234,000, Breckenridge – 116,000, Cowgill and Caldwell County PWSD No. 2 –

67,000, Polo – 107,000, and Caldwell County PWSD No. 3 – 119,600. Total daily demand is 818,550 GPD. Allgeier, Martin, and Associates, 1992 and Johns, 2000, propose a one percent per year growth rate in daily water usage. The projected usage in 50 years would be 1,350,000 gallons per day.

Reduced reliance on wells and cisterns, the growth of rural water supply district services, and the gradual increase in per capita daily water usage rates all lead to more public drinking water demand (Johns, 2000). In addition, the Department of Natural Resources Public Drinking Water Program has mandated that testing requirements and operator certification will become much more stringent beginning in 2004. Because of the age of these systems and potential costs to upgrade, it is doubtful that each municipality will continue to maintain a separate system in the future. The Caldwell County Commission feels strongly that a locally-controlled, dependable source of water is necessary for the continued growth and economic development of Caldwell County.

FLOODING

Floods occur at least every other year and inundate a majority of the Little Otter Creek floodplain. The pattern of flooding has resulted in an almost complete absence of permanent structures in the flood-prone area except for roads and bridges. Producers growing crops in the highly productive floodplain understand the risk and annually plant crops knowing some may not be harvested. Floods occur primarily during the period from March through June. Spring floods delay planting and cause producers to grow soybeans instead of corn. Floods greater than the 10-year recurrence interval cause floodwaters to spill over a topographic saddle on to the Cottonwood Creek floodplain. When the recurrence interval reaches the 100-year level, spill over floods 198 acres along Cottonwood Creek. Average annual damages to crop and pasture are estimated to be \$41,500; damages to roads and bridges are estimated to be \$14,000; and other agricultural damages, such as fences and debris, are estimated to be \$7,400.

RECREATION

There is an additional demand for 100,000 annual user days for fishing within 25 miles of the reservoir site. There is also a demand for walking and jogging trails, picnic areas, sites for family gatherings, and opportunities to observe wildlife.

TRANSPORTATION

Flood damages to roads include replacement and repair of road surfaces and removal of sediment deposits and debris. State and county highway departments place signs on roads to warn of flood hazards and to route traffic around flooded roads and bridges. Vehicles subjected to flooding receive damages from mud and water. Movement of all forms of traffic within flooded areas, including emergency vehicles and mail delivery, is greatly impaired or prohibited.

EROSION AND SEDIMENTATION

Approximately 28,300 tons of soil erode annually within the Little Otter Creek Watershed. An estimated 47 percent (13,300 tons) moves through the stream system, leaves the watershed, and enters Otter Creek. The remaining sediment is deposited on cropfields in upland areas; in farm ponds, wetlands, stream and gully channels; and on floodplains. Sediment sources include sheet-and-rill erosion, ephemeral and classical gullies, streambanks, floodplain scour, and road ditches. Sheet-and-rill erosion accounts for 50 percent of the total soil loss from all sources.

Approximately 60 percent of the sheet-and-rill erosion occurs on cropland acres. Ephemeral gully erosion occurs on cultivated fields and is responsible for 17 percent of the watershed's soil loss.

Classical gullies produce an estimated 5,700 tons of sediment each year. This is a relatively low rate of erosion for classical gullies. Shallow bedrock conditions and land treatment practices have slowed the development of gully systems within the project area. About 20 percent of total sediment is derived from classical gullies.

Streambank erosion accounts for nearly 1,500 tons of sediment annually. In general, streambanks are relatively stable. However, as with most systems, there are exceptions. A reach of Little Otter Creek located in the pool area of the proposed reservoir exhibits moderate to severe streambank erosion. This is evident especially along cutbanks in cultivated fields where corridor areas are void of woody vegetation. This reach produces approximately 65 percent of the streambank erosion for the entire watershed.

Soil losses from all sources of erosion are approximately 4.5 tons per acre per year for the entire Little Otter Creek Watershed.

Opportunities exist to reduce both erosion and sedimentation problems. Erosion and sedimentation resulting from sheet-and-rill soil losses, ephemeral gullies, and classical gullies will be reduced through ongoing and future conservation programs and by the requirement that soil losses be reduced to tolerable limits on 75 percent of the reservoir's drainage area. Vegetated buffer strips will be established around the reservoir that will serve to reduce erosion and act as a filter for sediment-laden waters. The reservoir will trap sediment, reduce gully erosion by providing grade stabilization benefits, reduce streambank erosion by inundating a moderate to severely eroding stream reach, and reduce sediment deposition in the downstream reach.

WATER QUALITY

Little Otter Creek is absent from Missouri's list of impaired waters under section 303(d) of the Clean Water Act. The greatest threats to water quality in the Little Otter Creek Watershed are from sediment, pathogens, nutrients, and toxic materials. Sediment sources include unstable channel banks, classical and ephemeral gullies, roads, road ditches, and poorly managed cropland, pasture, and forest land. Pathogens and nutrients can arise from human, livestock, and wildlife sources. U.S. Highway 36 poses a risk of water pollution by deicers, automotive and

combustion byproducts, and the risk of a release due to a transportation-related hazardous materials incident. Though agricultural non-point source pollution has not been associated with any impairment to water quality in Little Otter Creek, cropland or pasture mismanagement in close proximity to the reservoir poses a risk to water quality.

This plan provides opportunities to reduce or minimize the threats to water quality posed by sediment, pathogens, nutrients, and toxic materials. Described in detail below, intensely focused conservation efforts in the watershed will result in significant reductions in soil erosion and sediment delivery to the reservoir. Commensurate with reductions in sediment delivery, loading of nutrients, pathogens and metals that attach to soil particles would also be reduced. Due to the trapping efficiency of the reservoir, only a fraction of these compounds that reach the reservoir would be released downstream. The risks associated with a hazardous material incident on Highway 36 could be reduced by training first responders and equipping them with the means to contain spills.

LAND USE AND TREATMENT

The watershed has nearly 1,500 acres currently in the USDA-Conservation Reserve Program (CRP). CRP expiration dates range from 2005 to 2015. Bringing these lands back into crop production after expiration from CRP could significantly increase the need for land treatment to protect water quality of the planned water supply. Soil erosion, off-site sediment damages and agricultural non-point pollution can be reduced through education of producers and landowners, implementation of conservation practices, and stormwater and soil erosion regulations in the watershed.

Maintaining water quality to meet state standards for potential uses is an important concern for the proposed Little Otter Creek Watershed reservoir. Land treatment for water quality protection can be improved on agricultural land through existing Natural Resources Conservation Service (NRCS), Soil and Water Conservation District (SWCD), Missouri Department of Natural Resources (MDNR), Missouri Department of Conservation (MDC), and Environmental Protection Agency (EPA) technical, financial, and educational assistance programs. Small rural water supply watersheds, such as the Little Otter Creek Watershed, are eligible for the Missouri Conservation Reserve Enhancement Program (MoCREP). MoCREP can be used to protect water quality through incentive payments to convert cropland to permanent vegetative cover.

Development of the reservoir will convert 70 acres of cropland and 146 acres of grassland to water. This conversion will reduce the potential water quality degradation from agricultural non-point pollution, such as pesticides, commercial fertilizer, livestock waste, and sediment.

Caldwell County, and specifically the Little Otter Creek Watershed, experienced an insignificant amount of population and economic growth during the 1990s. Significant land use changes in Little Otter Creek Watershed due to residential, commercial, or industrial development is not expected. Residential housing on small-acre lots may increase due to development along the Interstate 35 corridor, the recent upgrade of U.S. Highway 36 to four lanes, potential increases in

jobs west of Caldwell County, and increased recreational opportunities resulting from this PL-566 project.

WILDLIFE HABITAT

Wildlife habitat quality is 48 percent of optimum for the selected indicator species – bobwhite quail. Refer to Appendix E, Investigations and Analyses, Biology section for methodology/species used to determine wildlife habitat units. Lower habitat values result from:

1. Lack of multi-species pastures and hayland;
2. Overgrazing pastures;
3. Forest grazing;
4. Forest fragmentation; and
5. Lack of undisturbed grassy and woody cover suitable for ground nesting birds.

Development of a 319-acre mitigation area with native trees, shrubs, and grasses will improve wildlife habitat. A detailed description of the wildlife resources and habitat values is presented in the Effects of Alternative Plans section.

STREAM RESOURCES

Little Otter Creek is a good quality north Missouri stream and supports a diverse fish community of at least 12 species. Approximately 3.7 miles of stream will be inundated by the proposed reservoir and 3.8 miles of stream below the reservoir will be impacted. Opportunities exist to mitigate for the impacted stream miles through measures, such as long term easements and downstream flow augmentation.

A 1.4 mile reach of the creek, just upstream of the proposed structure, exhibits moderate to severe streambank erosion. This reach will be stabilized by the reservoir's permanent pool and sediment delivery to downstream reaches will be reduced.

The riparian corridor of Little Otter Creek is generally in good condition. A portion of this good quality corridor will be inundated by the proposed reservoir. However, this loss can be mitigated by measures, such as enrollment of downstream reaches of riparian corridor in long term or perpetual easements. The shoreline along the permanent pool of the proposed reservoir will be allowed to return to natural vegetation. Over time, this area will revert to mature forest and shrubs.

WETLANDS

Missouri wetlands occupy 643,000 acres, about 1.4 percent of the state's area (Dahl, 1990). Before the arrival of European settlers, wetlands occupied about 4.84 million acres, about 10.8 percent of what is now Missouri, and were a significant component of the landscape (Epperson, 1992). Wetlands in Missouri are primarily associated with the major rivers and streams. Palustrine forested wetlands, palustrine emergent wetlands, and palustrine scrub-shrub wetlands

constitute most of the wetland acreage in Missouri (Epperson, 1992). Wetlands maintain water quality, mitigate flood effects, provide critical habitat for many threatened and endangered species, as well as provide opportunities for hunting, fishing, and birdwatching.

The National Wetland Inventory and the Farm Bill Wetland Inventory identified 16.58 acres of natural wetlands within the top of dam elevation of the project area (refer to Appendix D). Prior conversion of wetland areas for agricultural uses has reduced wetlands and wetland functions. The potential exists to create or restore wetlands in the pool areas of the reservoir, in the drainage area above the reservoir, and in areas downstream of the reservoir.

FOREST RESOURCES

Areas around the proposed reservoir's permanent pool will be managed for wildlife habitat, which will include forest stands. Mitigation measures for this project may include easements along stream reaches below the proposed reservoir. Such forested areas would stabilize streambank and shorelines, reduce erosion, and provide buffers to act as filters for non-point source pollutants.

SCOPE OF THE ENVIRONMENTAL IMPACT STATEMENT

Formal scoping for the Watershed Plan and Environmental Impact Statement began at a public meeting held in Caldwell County, Missouri, on June 20, 2001. Subsequent meetings are listed in the Consultation and Public Participation section of this document. Concerns listed in Table D were identified by watershed residents, as well as federal, state, and local agency representatives.

Major concerns included financial issues, landrights issues, the need for a dependable, locally-controlled, water supply, the need for recreational facilities, flooding, and lack of wildlife habitat.

Early in the scoping process, local residents favored multiple-purpose reservoir sites located in other locations within the county. Numerous reservoir locations were evaluated but only one site remained feasible throughout the process.

**TABLE D
EVALUATION OF CONCERNS^a**

Concerns	Degree of Concern	Significance to Decision Making	Remarks
Financial Issues	High	Low	Higher taxes, impact on real estate values
Landrights Issues	High	Medium	Fair treatment of landowners, restrictions to land use
Dependable Rural Water Supply Source	High	High	Demand for water increasing, private wells undependable, present systems inadequate
Lack of Public Water-based Recreational Facilities	Medium	High	Need for 100,000 annual user days for fishing within 25-mile radius
Flood Damages	Low	High	Planting delays, \$62,900 average annual damages to crops, roads, bridges
Lack of Wildlife Habitat	Medium	High	Concern of USFWS and MDC
Fisheries	Medium	Medium	Desire for enhanced flatwater fisheries
Wetlands	Low	High	Need to mitigate for lost wetland areas
Archaeological & Historical Resources	Low	Medium	Primary concern of State Historic Preservation Officer
Threatened & Endangered Species	Low	Medium	Primary concern of USFWS & MDC

a. The concerns and degrees of concern are public perceptions obtained during public meetings and may not be supported by field data gathered and analyzed as part of this project or by the views of the project Sponsors.



FORMULATION AND COMPARISON OF ALTERNATIVES

General

Two alternatives were developed for comparison in this plan. One is the recommended alternative that most efficiently solves the problems and addresses the purposes identified by the Sponsors and members of the watershed community. The other is the no-action alternative. Watershed residents and federal, state, and local agencies cooperatively participated in the formulation process. Public meetings were held to establish the problems to be addressed and select the most favorable and beneficial alternative. Also discussed were project costs, local financial commitment, and each participant's level of commitment to implement a watershed plan. Caldwell County's commitment and support is evidenced by the August 6, 2002, vote in favor of a countywide sales tax to assist in funding the project.

An analysis of several proposed measures was made to determine their effectiveness in achieving an acceptable and reasonable reduction in the public and natural resource problems that the plan is addressing. Formulation of alternative plans involved structural measures. Structural measures included multiple-purpose reservoirs to provide agricultural water management (rural water supply), recreational opportunities, and flood prevention; an extensive water delivery pipeline system to bring water to Caldwell County from a distant source; and installation of wells to provide additional water to meet current and growing demands.

Alternatives Considered But Eliminated From Detailed Study

1. Reservoir sites at locations other than site LO-1 (the recommended plan site). Five additional sites within the county boundaries were considered in the early planning stages. These included sites on Turkey Creek, North Mud Creek, unnamed tributaries, and a site on Little Otter Creek north of the proposed site (USDA-SCS, September 1991). Certain of these sites did not prove viable because drainage areas were too small to produce sufficient runoff and storage to provide the amounts of water needed to meet future, projected needs for rural Caldwell County and surrounding municipalities. Other sites that may have provided sufficient storage would have impacted major roads, railroads, powerlines, and/or homes and one site had an active quarry operation in the upstream drainage area. Sites outside of Caldwell County were not considered due to Caldwell County's desire to develop a locally-controlled water supply system.
2. Water delivery pipeline system from existing surface water sources. Existing surface water sources within Caldwell County are too small to provide the necessary quantities of water and are not amenable to enlargement due to limited drainage areas. Initially, Caldwell County sought to purchase water from the City of Hamilton, but an agreement could not be reached. Also, Hamilton's water supply reservoir is inadequate to meet present needs during drought periods. Such sources are even more uncertain when severe drought conditions, such as 1987-1989 and 2000, and projected water usage increases of one percent per year are considered (Allgeier, Martin, and Associates, June 1992 and Johns, October 2000).

Caldwell County has reached an agreement to purchase some water from Smithville Lake, but this is only a two-year agreement with no guarantees for future supplies or costs. To pipe 1.2 million gallons of water per day from Smithville Lake would cost \$10,000,000 according to preliminary figures prepared by Allstate Consultants. This is not an economically defensible alternative considering that the recommended plan has a cost estimate of \$6,200,000. The pipeline alternative also does not address the other plan purposes of increased recreational opportunities, enhanced fish and wildlife habitats, and flood prevention which would result in additional costs.

3. Installation of additional wells. Allgeier, Martin, and Associates, June 1992, concluded that it might be feasible to develop a groundwater supply in a glacial drift-filled aquifer located to the northeast of Caldwell County. However, their study only addressed PWSD No. 3, which has a total daily demand of 119,600 GPD as compared to the current total daily demand for Caldwell County of 818,550 GPD (Allstate Consultants, P.C., January 2002). Concerns have been documented that successful production from glacial drift aquifers in Daviess and Livingston Counties can be uncertain due to the potential for over-pumpage and uncertainty of recharge rates of the water-bearing horizons (Fuller, McMillen, Pick, and Russell, 1957). Considering the above concerns, as well as projected future increases in water demand, and the concern that water quality from well fields will deteriorate over time (Allgeier, Martin, and Associates, June 1992), a groundwater alternative was not considered reasonable. A well system outside of Caldwell County would not provide the desired locally-controlled water supply. Also, it would not address the other plan purposes of increased recreational opportunities, enhanced fish and wildlife habitats, and flood prevention.

Availability of a reliable supply of potable water is extremely limited within the PWSD No. 3. Although several public water systems exist, they lack the ability to expand sufficiently to alleviate the problem to any meaningful degree (Allgeier, Martin, and Associates, June 1992). Availability of water to meet demands countywide is even more limited. Thus, the recommended plan, which creates a locally-controlled, regional, surface water supply and fulfills other project purposes, is the only reasonable alternative identified and supported by the local Sponsors and the voters of Caldwell County.

Formulation Process

Problems and opportunities were identified through resource inventories, public meetings, steering committee involvement, and interviews. Three significant concerns were identified during the project evaluation process.

1. Inadequate water supply system for rural Caldwell County and surrounding municipalities.
2. Limited recreational and fish and wildlife facilities within 25 miles of the project area.
3. \$62,900 average annual damages to crops, pastures, fences, roads, and bridges in the lower reaches of Little Otter Creek and a portion of the adjacent Cottonwood Creek floodplain.

Soil erosion and existing land treatment were evaluated to determine the need and potential effects of appropriate measures. Financial, technical, and educational assistance to address soil erosion and potential agricultural non-point pollution is available through on-going federal and state programs. These programs are well suited to complement the PL-566 program.

DESCRIPTION OF ALTERNATIVE PLANS

Alternative 1 - (NED/Recommended Plan)

Alternative 1 is the recommended plan. This alternative includes the installation of one multiple-purpose reservoir to provide agricultural water management (rural water supply), recreational opportunities, and flood prevention. Refer to the Little Otter Creek Watershed Map, Appendix F, for approximate reservoir location.

Components

Structural:

- Construction of one multiple-purpose reservoir, water intake tower, and raw water line;
- Development of basic recreational facilities and enhancement of fish and wildlife habitats.

TABLE E
COSTS
(dollars)^a

Estimated Installation Costs	Public Law 83-566	Other Funds	Total
Structural Measures			
Multiple-Purpose Reservoir	2,819,000	2,332,500	5,151,500
Recreational Facilities	181,500	181,500	363,000
Water Intake Tower	195,000	195,000	390,000
Raw Water Line	162,500	162,500	325,000
TOTAL	3,358,000	2,871,500	6,229,500

Average Annual Costs	Amortization of Installation Costs	OM&R Funds	Total
Structural Measures			
Flood Prevention	51,300	2,200	53,500
Agricultural Water Mgmt.	241,200	4,000	245,200
Fish & Wildlife	90,100	19,800	109,900
TOTAL	382,600	26,000	408,600

Average Annual Benefits:	\$572,000
Benefit/Cost Ratio:	1.40

a. Price Base September 2001

Alternative 2 - (No-Action - Future Without-Project)

Alternative 2 is the no-action situation. Present conditions will remain substantially as is and no project measures will be implemented. Refer to forecasted future without-project conditions in the "Effects of Alternative Plans" section.

Components None

Costs None

EFFECTS OF ALTERNATIVE PLANS**FLOODWATER DAMAGES****Existing Conditions**

Floodwaters from the 100-year (1- percent chance-7.4 inches in 24 hours) storm damages 476 acres in the Little Otter Creek floodplain and another 198 acres in the adjacent Cottonwood Creek floodplain. Damages are primarily to cropland and pasture. Floodwaters also damage roads, bridges, fences, and deposit debris that requires cleanup. Floodwater damages have been calculated at \$62,900 on an average annual basis.

Alternative 1 - (NED/Recommended Plan)

Construction of the multiple-purpose reservoir within the Little Otter Creek Watershed will result in an average annual reduction of 96 percent in flood damages - \$62,900 to \$2,300. The reduction in damages is primarily those to cropland, pasture, roads, and bridges. The recommended plan will eliminate flooding on 490 acres within the 100-year floodplain.

Alternative 2 - (No Action - Future Without-Project)

Flooding is expected to remain the same without a watershed project. Flooding depths are expected to remain the same and no significant changes are anticipated in floodwater damages or the problems associated with floods.

TABLE F
AVERAGE ANNUAL FLOODWATER DAMAGES
(dollars)^a

	Future Without	Recommended Plan
Floodwater Damages		
Crop and Pasture	41,500	2,000
Fence (Other Ag.)	5,100	200
Debris	2,300	100
Road and Bridge	14,000	0
Total	62,900	2,300

a. Price Base September 2001

EROSION AND SEDIMENTATION

Existing Conditions

An estimated 28,300 tons of erosion occur annually within the Little Otter Creek Watershed. Approximately 13,300 tons (47 percent) move through the stream system, pass through the watershed outlet, and enter Otter Creek. Sediment sources include sheet-and-rill erosion, ephemeral and classical gullies, streambanks, floodplain scour, and road ditches. Moderate to severe streambank erosion occurs along the stream reach located upstream of the proposed reservoir embankment location. This 1.4 mile reach produces approximately 65 percent of the total streambank erosion for the watershed. Sheet-and-rill erosion contributes 50 percent of the total soil loss from all sources. Classical gullies produce an estimated 5,700 tons of sediment each year; 1,500 tons is derived from streambank erosion; and 4,800 tons from ephemeral gullies. Soil losses from all sources amount to about 4.5 tons per acre per year.

Alternative 1 - (NED/Recommended Plan)

Prior to construction of the multiple-purpose reservoir, its drainage area will be adequately protected for sheet-and-rill erosion. Erosion sources will continue to be addressed through ongoing and future conservation programs administered through the Caldwell County Soil and Water Conservation District (SWCD), NRCS field offices, and other community efforts. The multiple-purpose reservoir will trap sediment and other associated pollutants, provide grade stabilization benefits which will help reduce gully erosion, and significantly reduce streambank erosion along Little Otter Creek. The eroding stream reach will be stabilized by the reservoir permanent pool, and therefore reduce sediment delivered to downstream reaches. It is estimated that total watershed erosion will be reduced to 23,000 tons on an average annual basis while sediment leaving the watershed outlet will be reduced to 3,700 tons annually.

Alternative 2 - (No Action - Future Without-Project)

Ongoing and future conservation programs will address erosion and sedimentation concerns within the watershed. Gully and streambank erosion is expected to continue at present rates.

AGRICULTURAL WATER MANAGEMENT (RURAL WATER SUPPLY)

Existing Conditions

Caldwell County has long been in need of a dependable, rural water supply. Water for domestic use in the county is obtained from well systems (private and public) and surface reservoir storage. There is concern about not having an adequate water supply most of the time, but especially during periods of drought. It is during these periods that concerns become worries, as water levels in wells drop, wells go dry, and reservoirs are depleted. Many county residents have no reliable water supply on site at all and are forced to purchase and haul water for storage at their houses or businesses (Algeier, Martin, and Associates, 1992). Ponds and lakes for livestock water also dry up or become seriously depleted. The county was dangerously close to being “out of water” during the 1987-89 drought and again in 2000. Public water supply districts for rural areas experience difficulties in maintaining adequate and dependable water supplies.

The average daily and peak daily use of water for the City of Hamilton is 175,000 and 234,000 gallons per day. The Missouri Department of Natural Resources (MDNR) Public Drinking Water Section rates the present system capable of sustaining 180,000 gallons per day. If the city uses its supplemental system of pumping from a nearby creek, its capacity is 308,000 gallons per day. However, the city has not been successful in operating and maintaining this supplemental pumping system. The cities of Braymer, Breckenridge, Cowgill, Kingston, and Polo presently operate and maintain their own systems. Due to increased testing requirements, increased criteria of water quality, and increased treatment plant operator certification requirements scheduled to begin in 2004, the MDNR Public Drinking Water Section has serious doubts if these systems will be able to meet the requirements.

Caldwell County Public Water Supply District #3 is in the process of installing a water distribution system. Projected use is expected to be 129,000 gallons per day. Initial plans were to purchase water from the City of Hamilton. However, because the two entities were unable to reach an agreement, the district is intending to purchase water from the Smithville Lake area, which will require an additional pipeline at a cost of \$800,000. Presently, the district has only been able to reach an agreement to purchase water for a 2-year period. After that, it is anticipated the cost of supply could be increased.

Currently, the total daily demand for water in Caldwell County is 818,500 gallons per day (Allstate Consultants, January 2002). Allgeier, Martin, and Associates, 1992 and Johns, 2000, propose a one percent per year growth rate in daily water usage for PWSD No 3. Using the same growth rate for Caldwell County, the projected usage in 50 years would be 1,350,000 gallons per day. Reduced reliance on wells and cisterns, the growth of rural water supply district services, and the gradual increase in per capita daily water usage rates all lead to more public drinking water demand (Johns, 2000).

Due to these circumstances, the Caldwell County Commission requested assistance from NRCS in July 2000, and formed the Caldwell County Lake Project Steering Committee in August 2000. The commission charged the committee with the following goal: To provide recommendations for developing a county lake to meet the social and economic needs of the county. NRCS is assisting the committee through the Watershed Protection and Flood Prevention Act (Public Law 83-566).

Alternative 1 – (NED/Recommended Plan)

Multiple-purpose reservoir LO-1 in Little Otter Creek, will provide 4,920 acre-feet of storage for agricultural water management (rural water supply). A reservoir yield study was made using rainfall and runoff values from the 1950's, which is considered to be the drought of record. The reservoir will provide 1,240,000 gallons per day of water for public consumption. A dependable water supply will be available as soon as a delivery system is installed, fears caused by drought will be reduced, and those with no reliable water will be able to hook up to the regional system.

Several measures are planned to protect water storage capacity and enhance water quality. The Sponsors intend to purchase 695 acres of land for construction and development of the reservoir. A buffer strip of permanent vegetation will be established around the lake and agricultural use will be reduced in the drainage area. Special measures will be taken to reduce and/or eliminate potential sources of nutrients and pesticides in the watershed of Reservoir LO-1.

Alternative 2 – (No Action - Future Without-Project)

The need for a dependable source of quality public drinking water will continue.

ROAD AND BRIDGE DAMAGE**Existing Conditions**

There are 3 vehicular bridges and one railroad bridge over Little Otter Creek. Damages to roads and bridges, as a result of flood events, are estimated at \$14,000 on an average annual basis.

Alternative 1 - (NED/Recommended Plan)

As a result of the reduction of peak discharges, flood damages to roads and bridges below the multiple-purpose reservoir will be virtually eliminated.

Alternative 2 - (No Action - Future Without-Project)

Road and bridge maintenance and clean-up activities following flood events will continue as in the past.

RECREATION**Existing Conditions**

The demand for fishing within 25 miles of the project area is approximately 230,000 annual user days. There are 5 public lakes within 25 miles of the proposed reservoir that supply approximately 130,000 annual user days for fishing. Therefore, there is a demand of approximately 100,000 additional annual user days for fishing.

Alternative 1 - (NED/Recommended Plan)

Development of the multiple-purpose reservoir and recreational facilities will provide much needed opportunities for fishing, picnicking, walking, family gatherings, and wildlife observation. Hunting or trapping may also be available if the Sponsors determine that they are allowed. The reservoir will supply approximately 60,000 annual user days for fishing. Recreational facilities and fish and wildlife habitat development will include a boat ramp, parking facilities, restroom facilities, a hiking trail, shelterhouse, a fishing pier (platform), and tree, shrub, and other vegetative plantings.

Alternative 2 - (No Action - Future Without-Project)

No significant change in the amount of public or private recreational area is expected without the project. The community's desire for additional recreational development will not be addressed.

WETLANDS**Existing Conditions**

Wetland habitat quality has been reduced as wetlands within the watershed have been impacted by agricultural activity. The National Wetland Inventory and the Farm Bill Wetland Inventory identified 16.58 acres of natural wetlands within the top of dam elevation of the project area (refer to Appendix D). The classifications of these wetlands are listed in Table G.

TABLE G
WETLANDS IDENTIFIED WITHIN THE TOP OF DAM ELEVATION¹

<u>Offsite Method and Classification</u>	<u>Acres</u>
National Wetland Inventory	
² PEMC	1.30
² PFO1A	5.10
² R2USA	<u>0.50</u>
Subtotal	6.90
Farm Bill Wetland Inventory	
Farmed Wetlands	1.40
Wooded Wetlands	<u>8.28</u>
Subtotal	9.68
Total	16.58

¹Wetlands were identified with offsite methods and these inventories only. Wetlands identified by these inventories overlap in some cases, therefore, the total acres may be slightly lower (refer to Appendix D). A certified wetland determination will be conducted prior to construction to assess potential impacts to wetlands.

²The definition of these National Wetland Inventory modifiers can be found on the wetland inventory maps in Appendix D.

Alternative 1 – (NED/Recommended Plan)

There will be no net loss of wetlands as a result of project activities. It is anticipated that 109 acres of wetlands will be created in the shallow portions of the reservoir's permanent pool. Additional temporarily or seasonally flooded wetland habitat and water sources for wildlife will be created on approximately 62 acres within the temporary pool.

Alternative 2 - (No Action - Future Without-Project)

No change is anticipated in wetland resources.

WILDLIFE HABITAT

Existing Conditions

Wildlife habitat quality is 48 percent of optimum for the selected indicator species, bobwhite quail, with approximately 102 habitat units on cropland, upland, and bottomland hardwoods acreage within the proposed permanent pool boundary. Contributing factors for the low habitat value include monotypic and overgrazed pastures, forest grazing and fragmentation, and lack of undisturbed grassy and woody cover suitable for ground nesting birds. Refer to Appendix E, Investigations and Analyses, Biology section for methodology/species used to determine wildlife habitat units.

Alternative 1 - (NED/Recommended Plan)

Implementation of the recommended plan will result in a net increase of wildlife habitat quality. Measures in the plan that will improve habitat include a 319-acre area with restoration of woody and grassland habitat, livestock exclusion, and 24 acres of grassland cover gained on the structure for Reservoir LO-1.

Alternative 2 - (No Action - Future Without-Project)

No significant change is anticipated in wildlife habitat quality. Continued loss of the quantity of wildlife habitat in the project area will be due to increases in agricultural and urban uses.

FOREST RESOURCES**Existing Conditions**

Forestland comprises 862 acres or 14 percent of the watershed. Forest types are predominantly central hardwoods with the only native conifer being Eastern Red Cedar. Many of the timbered areas occur along Little Otter Creek and its tributaries. The forest stands are second growth timber and generally in poor condition. Many of the woodlots are grazed.

Alternative 1 – (NED/Recommended Plan)

Construction of the proposed 362-acre reservoir will inundate 65 acres of upland hardwoods and 77 acres of bottomland hardwoods. The loss of 142 acres of forestland will be mitigated by establishment of hardwoods in the mitigation area adjacent to the reservoir and/or with easements along the stream channel below the reservoir. Mitigation for forest resources will be coordinated with the Missouri Department of Conservation (MDC) and the U.S. Fish and Wildlife Service (USFWS).

Alternative 2 – (No Action – Future Without Project)

The condition of forestland is expected to remain relatively unchanged without the project.

STREAM RESOURCES**Existing Conditions**

Little Otter Creek is a very good quality north Missouri stream. The gravel/cobble substrate present in Little Otter Creek is unique in north Missouri streams. The areas with bedrock substrate act as grade control and prevent further downcutting of the channel bottom. Some moderate to severe streambank erosion occurs along the stream reach located upstream of the proposed reservoir embankment location. Little Otter Creek supports a very good fish community and the riparian corridor is better than average for north Missouri streams.

Alternative 1 – (NED/Recommended Plan)

Implementation of the recommended plan will result in the inundation of approximately 1.8 miles of good quality 4th order stream. An additional 1.4 miles of 3rd order and 0.5 miles of 2nd order stream will also be inundated.

Water temperatures in the stream below the reservoir may be changed. Assuming there is a surface discharge, water temperature could be warmed during the summer months. It is unknown how far downstream water temperatures will be effected. Little Otter Creek is generally shaded and the water should cool fairly quickly. Dissolved oxygen should not be an issue provided there is a surface discharge from the structure. If there is a discharge from the hypolimnion during periods of stratification, low dissolved oxygen could be a concern.

Changes in fish diversity below the reservoir may occur. Changes in flow regime and temperature may adversely affect sensitive stream species. Some predatory fish, such as largemouth bass, crappie, and bluegill will likely escape the reservoir through the spillway and enter the stream. These species would be absent or present in low numbers under without-project conditions.

A 3.8 mile reach of Little Otter Creek downstream of the reservoir outlet will be impacted once construction starts and will continue to be impacted by very low or no flow until the reservoir is full. Flow conditions are likely to be altered in the downstream reach following installation of the reservoir. Prior to obtaining necessary project permits and prior to the start of construction, NRCS will convene a working group comprised of relevant state and federal personnel, as well as the project Sponsors, to address mitigation for the loss of stream habitat.

Mitigation measures for the 3.7 miles of stream that will be lost due to inundation could include, but are not limited to, perpetual or long term easements on riparian areas in the Little Otter Creek watershed and/or cash payment to the Stream Stewardship Fund. Flow augmentation, to the extent practicable, will replicate natural baseflow conditions and will be a component of measures needed to mitigate the impacts to Little Otter Creek between the reservoir outlet and the confluence with Otter Creek.

Alternative 2 – (No Action – Future Without Project)

If no action is taken, this good quality north Missouri stream should continue to support a good fish community.

WATER QUALITY

Existing Conditions

Water quality in Missouri is regulated (Missouri Clean Water Commission, Water Quality Standards, 10 CSR 20-7) by classifying water bodies according to designated beneficial uses and then assigning specific numeric water quality criteria that must be maintained to protect the assigned beneficial uses. Water bodies that are not classified, fall under the General Criteria (10 CSR 20-7.031(3)) for all waters of the state. Little Otter Creek is an unclassified stream and is regulated under the General Criteria.

Water bodies that fail to meet either general or numeric criteria are required to be listed as impaired water bodies under Section 303(d) of the federal Clean Water Act. Little Otter Creek does not appear on either the current (1998) or on the draft (2000) 303(d) lists.

The greatest threats to water quality in the Little Otter Creek Watershed are from sediment, pathogens, nutrients, and toxic materials. Sediment sources include unstable channel banks, road ditches, and inadequately protected cropland, pasture, and forestland. Pathogens and nutrients can arise from human, livestock, and wildlife sources. Toxic materials are most likely to arise from the transportation corridor along U.S. Highway 36.

Alternative 1 - (NED/Recommended Plan)

Installation of the recommended plan is expected to improve the water quality in Little Otter Creek by trapping and treating pollutants entering the structure from upstream. Retention basins typically have pollutant removal efficiencies of 50-80 percent for suspended solids, 30-65 percent for nitrogen, 30-65 percent for phosphorus, <30 percent for pathogens and 50-80 percent for metals (USEPA, 1999).

The National Pollutant Discharge Elimination System rules require a Storm Water Pollution Prevention Plan (SP3) on construction sites disturbing 1 or more acres. Although a SP3 will be prepared for the site, a short-term decline in water quality may occur as a result of sediment discharge associated with construction activities.

Alternative 2 - (No Action - Future Without-Project)

If no action is taken, water quality conditions could gradually degrade should there be increased development in the watershed.

AIR QUALITY**Existing Conditions**

Air quality in the Little Otter Creek Watershed and the surrounding area is typical for rural agricultural areas in Missouri. Dust from county roads, pollen and mold from vegetation, and odors associated with livestock are not uncommon.

Alternative 1 – (NED/Recommended Plan)

Construction activities may cause a temporary decline in local air quality due to the release of exhaust emissions, smoke, and dust.

Alternative 2 – (No Action – Future Without – Project)

Air quality in the Little Otter Creek Watershed and surrounding area is not likely to change if no action is taken.

LAND USE AND TREATMENT**Existing Conditions**

There are 1,782 acres of cropland, 759 acres of pasture, 570 acres of hayland, 1,797 acres of CRP and grassland, 862 acres of forestland, 101 acres of brush, and 452 acres of farmsteads, water, roads and railways. Seventy-three percent of the cropland is not treated and has soil erosion rates greater than the acceptable level (T-value). Ninety-eight percent of all pasture, hayland, and grassland have soil erosion rates within the acceptable level. All of the forestland, brush, and other land have erosion rates within the acceptable level. Assistance through current federal and state land treatment programs is underused in the watershed.

Alternative 1 – (NED/Recommended Plan)

Construction of the proposed reservoir will permanently convert 70 acres of cropland, 146 acres of grassland, 142 acres of forest and brush, and 4 acres of roads and farmsteads to open water. An additional 62 acres of forest and grassland will be seasonally wet.

Development of the water supply reservoir, increased awareness of water quality hazards, and utilization of voluntary federal and state financial, technical, and educational assistance programs will increase land treatment practices and have a positive effect on water quality in the watershed. Installation of the reservoir could make the watershed eligible for additional land treatment and water quality improvement programs. Installation of the reservoir could also make the watershed and land users in the watershed more competitive to receive cost share and grants.

There is potential for land currently under 10-year Conservation Reserve Program (CRP) contracts to be converted to cropland as contracts expire. The conversion of CRP fields to crop fields that are not adequately treated is a concern. It is expected that implementation of the Recommended Plan will include an accelerated information/education campaign and eligibility for conservation programs to continue the soil erosion protection that CRP provides.

Practices that will improve water quality in the watershed and are eligible for federal and state financial, technical, and educational assistance include, but are not limited to, filter strips, riparian forest buffers, livestock exclusion, pest management, nutrient management, prescribed grazing, grade stabilization structures, water and sediment control basins, terraces, grassed waterways, well decommissioning, tree planting, and forest stand improvement.

Some potential programs that may provide financial and educational assistance to improve watershed protection include Caldwell County SWCD educational events, the SWCD/DNR state cost-share program, the USDA Environmental Quality Incentives Program, Conservation Reserve Program and Conservation Reserve Enhancement Program, and the EPA 319 Water Quality Program.

Alternative 2 – (No Action – Future Without Project)

Caldwell County, and specifically the Little Otter Creek Watershed, experienced an insignificant amount of population and economic growth during the 1990s. Significant land use changes in Little Otter Creek Watershed due to commercial or industrial development is not expected. Residential housing on small acre lots may increase due to development along the Interstate 35 corridor, the recent upgrade of U.S. Highway 36 to four lanes, potential increases in jobs west of Caldwell County, and increased recreation opportunities through the PL-566 project. It is expected that the rural setting will remain and increases in residential development will not impact a significant portion of the watershed.

The watershed has nearly 1,500 acres currently in the USDA-Conservation Reserve Program (CRP). CRP expiration dates range from 2005 to 2015. Conversion of CRP fields to cropland without adequate treatment is a significant concern.

THREATENED AND ENDANGERED SPECIES

The Section 7 consultation process in the Endangered Species Act was followed. The U.S. Fish and Wildlife Service provided information stating that the Indiana bat and the Topeka shiner, a federal and state endangered species, may occur in the watershed. The scope and nature of the project indicate that the project is not likely to adversely impact either of these species. This precludes the need for preparation of a biological assessment.

Indiana bat

The Indiana bat (*Myotis sodalis*) may occur in the watershed. In order to avoid adverse impacts to the Indiana bat, the guidelines developed by the U.S. Fish and Wildlife Service for the conservation of the bat will be followed as per NRCS Biology Technical Note No. 17.

Topeka shiner

The Topeka shiner is a minnow of small, clear, low-order prairie streams. Historically, the federally listed endangered Topeka shiner (*Notropis topeka*) occurred in reaches of Shoal Creek. Little Otter Creek flows into Otter Creek which in turn flows into Shoal Creek. The Aquatic GAP evaluation confirmed that the Topeka shiner does occur in the Plains-grand-Chariton Ecological drainage unit (EDU), which includes Little Otter Creek.

Initial site investigations of Little Otter Creek indicated that it might be suitable for the Topeka shiner. As a result, the Missouri Department of Conservation conducted a survey of the fish community to determine the presence of the Topeka shiner. Samples were collected at three locations: 1) at the proposed structure site, 2) within the middle reach of the proposed reservoir, and 3) at the upper reach of the proposed pool. No Topeka shiners were collected. Therefore, it is unlikely that the Topeka shiner will be affected by the proposed project.

CULTURAL RESOURCES

A cultural resources review was made of the proposed project by the Missouri Cultural Resources Specialist (CRS). Elements of the review included a field survey of more than 300 acres of proposed dam and pool areas by the CRS and two assistants. Known historic properties (such as Haun's Mill located about 6 miles south and east of the project site) will not be impacted by the proposed project. There are no tribal lands in Missouri, and Caldwell County was not listed as an area of interest in the Native American Consultation Database. NRCS will contact the appropriate tribal representatives to determine if there are any areas of ancestral interest and initiate any necessary consultation prior to design and construction.

RELATIONSHIP TO OTHER PLANS, POLICIES, AND CONTROLS

Caldwell County is participating in the National Flood Insurance Program with the Federal Emergency Management Agency (FEMA) and the Missouri State Emergency Management Agency (SEMA). Project measures included in this plan conform to the same principles and are consistent with the conclusions and recommendations of the flood insurance program.

The conservation provisions of the 1985 Food Security Act, the 1990 Food, Agriculture, Conservation, and Trade Act, and the 1996 Federal Agriculture Improvement and Reform Act were considered during the development of this plan. Impacts from these farm bills that involve land use changes and land treatment measures were incorporated into this Watershed Plan and Environmental Impact Statement.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS

Irreversible and irretrievable commitments of resources consist of labor, material, and energy needed for installing and maintaining project measures. Permanent alteration of land use and cover will occur on approximately 362 acres as a result of the implementation of project measures. These acres will be converted to the reservoir's permanent pool.

CIVIL RIGHTS IMPACT ANALYSIS

An analysis of the project setting and implementation of the recommended plan disclose that there will be no detrimental effects. Implementation of the project will provide a source for rural water supply and may provide opportunities for minority contractors and construction company employees.

RISK AND UNCERTAINTY

Installation of the multiple-purpose reservoir will be dependent upon the Sponsors acquiring appropriate landrights or easements and issuance of all necessary permits including the Department of the Army 404 and Missouri Department of Natural Resources 401 permits. Numerous public meetings, steering committee involvement, and media coverage indicate significant public support for the project within the community. The ability of Caldwell County officials to reach mutual agreement with affected landowners is crucial in determining whether or not this project is implemented.

Some risk and uncertainty are associated with project funding. Funding appropriations for the Watershed Protection and Flood Prevention Act, Public Law 83-566 have decreased over the past years and several completed plans await funding. It is believed that the Little Otter Creek Plan is a sound, environmentally sensitive project with strong local support and all efforts will be made to secure the necessary federal funds.

Local matching funds will be sought through grant monies, bond issues, sales taxes, or other non-federal sources. The voters of Caldwell County approved a 0.5 percent sales tax on August 6, 2002, to assist in funding the local match for project installation.

RATIONALE FOR PLAN SELECTION

Alternative 1 is both the National Economic Development (NED) and the recommended plan. This structural measure provides the most economically, environmentally, and socially acceptable alternative to address resource issues within the Little Otter Creek Watershed and Caldwell County. The recommended plan was selected by the watershed Sponsors as the most efficient and effective means to accomplish their goals.

COMPARISON OF ALTERNATIVE PLANS**TABLE H**

Effects	Alternative 1 (Recommended Plan)	Alternative 2 (Without - Project)
MEASURES		
Structural	Installation of one multiple-purpose reservoir	None
PROJECT INVESTMENT		
Structural	\$6,229,500	-0-
National Economic Development (NED) Account		
Average Annual Costs	\$408,600	-0-
Average Annual Beneficial Effects	\$572,000	-0-
Net Beneficial Effects	\$163,400	-0-
Environmental Quality (EQ) Account		
Fisheries/Wildlife Habitat	No net loss of wetlands, increased wildlife habitat quality, conversion of 3.7 miles of stream habitat to a 362-acre reservoir, enhanced flatwater fisheries, altered flow regime on 3.8 miles of stream below reservoir outlet	Continued good quality stream habitat, no change in wildlife habitat quality, reduction in quantity of wildlife habitat
Scenic/Aesthetic Improvements	Natural regeneration of vegetation along reservoir shoreline, picnic area, hiking trail	Continued rural setting; wooded riparian corridor, CRP, pasture, row crops
Erosion/Sediment Reduction	Total watershed erosion reduced, sediment delivered to watershed outlet reduced	Erosion/sedimentation will continue at near current rates
Water Quality	Expected improvement of water quality	Gradual degradation of water quality
Wetlands	No net loss of wetlands. The 16.58 acres of wetlands impacted will be mitigated	No change is anticipated
Stream and Riparian Areas	Conversion of a wooded riparian corridor along stream to a naturally revegetated lake shoreline	Continued good quality riparian corridor
Other Social Effects (OSE) Account		
Flood Damages	96% reduction in flood damages	No reduction in flood damages
Insufficient Recreational Opportunities	Basic recreational facilities, enhanced fish & wildlife habitats, 60,000 recreational visits annually	Continued lack of recreational facilities
Real Estate Values	Expected increase in property values	Decreased values
Flood-related Social, Economic, & Psychological Problems	Problems greatly reduced	Continued problems
Regional Economic Development (RED) Account		
Average Annual Beneficial Effects	\$572,000	-0-
Average Annual Adverse Effects		
Installation Cost	\$176,300	-0-
Average Annual OM&R	\$26,000	-0-

CONSULTATION AND PUBLIC PARTICIPATION

On October 10, 1991, the Caldwell County Commission requested assistance through the Watershed Protection and Flood Prevention Act, Public Law 83-566. The request was made to the USDA-Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service (SCS). The request was in response to local concerns and interest to address a continuing need for a dependable, countywide water supply system. Numerous public and other meetings have been held to receive public input, discuss potential solutions, and provide updates on project activities. Meetings are summarized as follows:

June 22, 1990	City officials met with NRCS watershed planning staff.
August 3, 1992	Caldwell County Commission filed an application for federal assistance for Little Otter Creek Watershed with NRCS.
September 2, 1992	Soil and Water Districts Commission assigned high priority status to Little Otter Creek Watershed planning.
January 5, 1993	NRCS met with newly formed steering committee for the Little Otter Creek Watershed.
February 23, 1993	NRCS staff met with the steering committee and potential landowners affected by the project.
July 7, 2000	Following several years of inactivity by the Sponsors, the Caldwell County Commission and Caldwell County Soil and Water Conservation District requested assistance from NRCS to renew planning on a project in the Little Otter Creek Watershed to provide a dependable rural water supply system and flood prevention.
August 21, 2000	Public meeting to discuss proposed reservoir sites, water needs, treatment plant, raw water line, and recreational opportunities.
September 18, 2000	The Caldwell County Lake Project Steering Committee met and recommended the Caldwell County Commission serve as the primary Sponsor of the project.
June 20, 2001	A formal public meeting was held to identify and prioritize watershed concerns.
January 7, 2002	The Caldwell County Commission requested that NRCS design a multiple-purpose reservoir in the Little Otter Creek Watershed to provide a minimum of 1,200,000 gallons per day of water supply.

January 11, 2002	The Caldwell County Lake Project Steering Committee accepted a preliminary engineering report regarding feasibility and entitled “Caldwell County Regional Water Supply “ from Allstate Consultants.
August 6, 2002	The voters of Caldwell County approved a 0.5 percent sales tax to assist in funding the local match for project installation.
September 5, 2002	A meeting was held with the Caldwell County Commission, the Caldwell County Lake Project Steering Committee, and the landowners that will be directly impacted by installation of water supply reservoir LO-1. The recommended plan was presented and questions concerning the project were addressed.
Various Dates	Numerous contacts and meetings have been held with State Historic Preservation Office officials regarding cultural resources and with the U.S. Fish and Wildlife Service regarding threatened and endangered species.
Significant Written Comments	A list of recipients receiving copies of the draft Little Otter Creek Watershed Plan – Environmental Impact Statement is included in Appendix A. Letters, comments, and responses concerning the draft Plan–EIS are reprinted in Appendix A.

RECOMMENDED PLAN

PURPOSES

1. Agricultural Water Management (rural water supply);
2. Fish, wildlife, and recreational development;
3. Flood prevention and reduction of flood damages.

SUMMARY

The National Economic Development (NED) plan is the recommended plan. It was selected by the Sponsors for implementation. The plan includes one multiple-purpose reservoir for agricultural water management (rural water supply); fish, wildlife, and recreational development; and flood prevention in Caldwell County, Missouri. The project installation period is estimated at 4 years. Proper operation, maintenance, and replacement is planned for all measures for the 100-year life of the project.

The benefit/cost ratio is 1.40.

STRUCTURAL MEASURES TO BE INSTALLED

Multiple-Purpose Reservoir

Multiple-purpose reservoir LO-1 is designed to serve the purposes of agricultural water management (rural water supply), recreation, and flood prevention. The reservoir will provide 1,240,000 gallons of water per day for public consumption. The reservoir will be located two miles east of Hamilton, Missouri, and slightly more than two miles south of U.S. Highway 36 in Caldwell County. (Refer to Little Otter Creek Watershed Map, Appendix F).

The Caldwell County Commission, upon receiving recommendations from the Caldwell County Lake Project Committee, determined water demands. Water use within the county was detailed by the Green Hills Regional Planning Commission. A reservoir operation study was made to assure that an adequate amount of runoff occurs to supply the demand. A preliminary engineering report (Allstate Consultants, P.C., January 2002) was also prepared to determine feasibility of the project. Existing needs, future needs, and current water usage is detailed in the Watershed Problems and Opportunities section of this plan.

Recreational Facilities

A portion of the land acquired for the multiple-purpose reservoir will be used to develop basic recreational facilities and enhanced fish and wildlife habitats. (Refer to Site and Recreational Facilities Map, Appendix B). Basic facilities planned include:

hiking trail
shelterhouse
boat ramp
fishing pier/platform

restrooms
parking facilities
tree and shrub plantings

These facilities will provide much needed recreational opportunities in Caldwell County. Refer to Table 2B for specific components of recreational development.

PRE-DESIGN CONFERENCE

A pre-design conference will be held prior to the initiation of the field survey for the reservoir. The conference will be scheduled by the NRCS project engineer and attended by the NRCS district conservationist and other necessary NRCS personnel, MDC and USFWS representatives, other appropriate state and federal personnel, and officials of Caldwell County. Design details of the embankment and reservoir will be discussed. These will include: limits of areas to be cleared and grubbed; pool size, depth, and surface area; fencing details; mitigation criteria; and environmental opportunities. Environmental opportunities include wildlife enhancements, wetland development, streamflow augmentation, and dry hydrants. Easement areas adjacent to the reservoir will be used for wildlife enhancement. Mitigation criteria are described under the heading Mitigation Features.

ENVIRONMENTAL CRITERIA

Under the Clean Water Act, the National Pollutant Discharge Elimination System rules require a Storm Water Pollution Prevention Plan (SP3) on construction sites disturbing one or more acres. A SP3 will be prepared for the site under the Land Disturbance Permit requirements of the Missouri Department of Natural Resources Water Pollution Control Program. This plan will seek to minimize the discharge of sediment and other pollutants during construction and set forth requirements for establishing permanent vegetation on the site when earthwork is completed.

Permanent vegetation will be established on the embankment, spillway, and surrounding areas of the multiple-purpose reservoir immediately following completion of the final grading and finish operations. Sod-forming grass will be seeded on the embankment and spillway. Seeding mixtures containing clump-type grasses and legumes are not acceptable because of inadequate soil cover and deep root structure. However, areas surrounding the embankment and spillway will be seeded or planted with a mixture of plant materials to provide habitat for wildlife. NRCS, MDC, and other appropriate state and federal personnel will develop planting recommendations.

A mitigation plan establishing wildlife habitat at the reservoir site will be developed jointly between representatives of NRCS, MDC, USFWS, other appropriate state and federal personnel, and the project Sponsors. Planting costs have been included as part of the structural measures cost.

The construction period for the reservoir is expected to be one construction season. If construction extends beyond one construction season, temporary seeding of the disturbed areas will be done as soon as possible when winter shut-down seems imminent.

The general policy of the plan is to limit clearing of the reservoir area to that needed for the dam, spillway, and that portion of the permanent pool needed for the borrow area. The permanent pool will be cleared to a minimum distance of 400 feet from the upstream toe of the dam. Additional area will be cleared as needed for borrow material. Timber and woody growth will be left standing in the upper ends of the pool, coves, and side-gully tributaries. The purpose of this practice is to improve wildlife habitat diversity.

In borrow areas that will be covered with shallow water, either permanent or temporary, the soil surface should be left to create an undulating bottom. Leaving the bottom at various elevations, including pools, will create diverse wetland habitat suitable to a wider array of species. MDC and USFWS personnel will be consulted either prior to or during construction for recommendations on this design.

All applicable state and federal standards for minimizing water, air, and noise pollution will be followed during all project activities. Water and air pollution that may be caused by construction activity will be minimized by utilizing the following methods, as applicable:

1. Leave existing vegetation on work areas as long as possible;
2. Establish temporary vegetative cover on areas where work is not ongoing;
3. Construct runoff water diversions; and
4. Use silt-filtering fabric.

Prior to construction, the area to be inundated will be systematically surveyed to determine the presence of any solid or hazardous wastes. All waste that is found below the elevation of the top of the dam will be removed and properly disposed of. In addition, the Missouri Department of Natural Resources (MDNR) will be asked to check their records for the presence of any active or abandoned solid or hazardous waste or leaking underground storage tank sites within the Little Otter Creek Watershed. Appropriate action will be taken to assure that the risk of any discharge to the reservoir is minimized.

MITIGATION FEATURES

Features of the plan that will reduce detrimental impacts on wildlife include limited clearing for construction of the reservoir, installation of a draw-down pipe to regulate permanent pool size, restricted work limits, and flow augmentation to replicate, as nearly as practical, natural baseflow conditions downstream of the reservoir. Other features planned to mitigate impacts on wildlife (measured in habitat units) include development of 319 acres of wildlife habitat adjacent to the reservoir.

Approximately 102 units of wildlife habitat will be lost on cropland and upland and bottomland hardwoods that will be converted to the permanent pool (refer to Appendix E, Investigations and Analyses, Biology section). The 102 habitat units lost will be mitigated with 102 habitat units on a 319-acre mitigation area adjacent to the reservoir. When obtaining mitigation acres around the reservoir, credit will be given for the acres in the required buffer zone and the temporary pool area. Areas obtained for mitigation will be maintained in a natural state if the existing vegetation

consists of wildlife friendly species and can be managed to meet the goal of a 0.80 HSI for bobwhite quail. As needed, grasses, trees, shrubs, and other vegetation will be planted based upon recommendations provided by appropriate federal and state personnel. Any portion of the mitigation area that has wetland characteristics will be allowed to regenerate naturally. Grazing will be prohibited. Mowing will be allowed where necessary to enhance recreational opportunities or as a method to enhance wildlife habitat when approved by appropriate MDC and USFWS personnel.

Timber management will be allowed based on the recommendations of a MDC forester and/or other appropriate state or federal personnel. Trees will not be removed from the permanent or temporary pool areas except as needed for excavation of borrow materials required for construction of the reservoir embankment. Full credit for the compensation acres could begin at the time the land is acquired. Mitigation areas will be fenced, where necessary, to exclude livestock. Prescribed burning that is consistent with wildlife habitat enhancement may be performed on the mitigation area, embankment, spillway, and adjacent grassland. An NRCS approved prescribed burn plan will be followed. Haying will only be allowed after July 15, if approved annually by appropriate state and federal personnel, and if it were determined that use of these practices would maximize wildlife habitat.

Prior to obtaining the necessary project permits and the start of construction activities, NRCS will conduct meetings with relevant state and federal personnel, as well as the project Sponsors, to discuss mitigation for stream loss. Mitigation measures for the 3.7 miles of stream that will be lost due to inundation could include, but are not limited to, perpetual or long term easements on riparian areas in the Little Otter Creek Watershed and/or cash payment to the Stream Stewardship Fund. Flow augmentation, to the extent practical, will replicate natural baseflow conditions and will be a component of measures needed to mitigate the impacts to Little Otter Creek between the reservoir outlet and the confluence with Otter Creek.

Mitigation features may include, but are not limited to, fencing materials and wildlife plantings as approved by appropriate state and federal personnel and the Sponsors. All mitigation measures will be installed using the average cost method. The mitigation area will be fenced, if necessary, to exclude livestock access. Fence will be installed according to NRCS Fencing Specification 382. Mitigation features will be installed at 100 percent of the approved average cost.

Sponsors are responsible for assuring that the mitigation acres are identified and set aside. Availability of construction dollars will be dependent upon a balanced acquisition of the mitigation area as the project proceeds.

A certified wetland determination will be conducted prior to construction to assess potential impacts to wetlands. The appropriate federal and state agencies will be contacted to obtain the necessary permits.

MULTIPLE-PURPOSE RESERVOIR

The multiple-purpose reservoir will be designed using NRCS Technical Release 60 criteria due to the class (c) hazard classification. Specific data for the reservoir are provided in Table 3.

Storage for approximately 2 watershed inches of sediment is reserved in the reservoir with 85 percent being submerged and 15 percent being stored above the permanent pool.

Design of the reservoir embankment is based on class (c) hydrologic criteria. The principal spillway will consist of a single stage, reinforced concrete riser and reinforced concrete pipe that outlets into a riprap-lined stilling basin. A drawdown pipe will be included in the embankment at the bottom of the permanent pool. A low flow port will also be installed to augment streamflow below the reservoir.

The reservoir is designed to store the routed excess from the 100-year, 10-day storm event. The design includes temporary storage for the runoff from a 100-year return period, 24-hour duration storm (approximately 7.4 inches of rainfall) before the auxiliary spillway begins to flow. The auxiliary spillway has a one percent or less chance of flowing in any given year.

The reservoir dam has been classified as class (c) hazard. It is designed to safely convey the runoff from the probable maximum precipitation storm through the structure without extensive damage. Class (c) dams are those located where failure may cause loss of life or serious damage to homes, industrial and commercial buildings, important public utilities, main highways, and railroads. This classification was based on the potential hazard due to the presence of buildings, rural highways, and a railroad located in the floodplain below the reservoir. Although the dam is not expected to fail, if it does some buildings could be affected. Limits of the flood wave from such a failure or breaching is delineated on the breach inundation map in Appendix C. Delineation of the flood boundaries was terminated where the water surface elevation of the breach flow is less than the elevation of a 100-year flood with the dam built. To avoid the possibility of creating unsafe conditions, future development within the breach inundation zones will be in accordance with the regulations of the federal floodplain management and flood insurance programs.

Since the reservoir dam is class (c) hazard classification, an emergency action plan will need to be prepared by the Caldwell County Commission prior to initiating construction. The purpose of the emergency action plan is to outline and define procedures to be followed in the event critical conditions develop relative to the dam. These conditions could result in the uncontrolled release of water or failure of the dam. The plan will also outline responsibilities of key personnel who will take necessary and immediate action in the event such conditions develop. Due to the close proximity of U.S Highway 36, the emergency action plan should also include actions to protect the water supply in the event of a transportation accident that results in a hazardous materials incident.

The Sponsors will secure landrights needed for installation and maintenance of the reservoir. Landrights will be either fee-simple title or term easements for the life of the project and will be obtained for the dam areas, spillways, and pools. Landrights will cover an area equal to that at the elevation of the crest of the auxiliary spillway. The area to be effected is estimated at 695 acres. This will include 362 acres for the permanent pool (includes storage for sediment, recreation, and rural water supply); 62 acres for the temporary pool; 80 acres for the embankment and spillway; and an additional 191 acres for buffer areas. One property relocation is anticipated with installation of the reservoir.

NRCS will recommend that the Sponsors give consideration to acquiring additional landrights to cover an area to the top of dam elevation. These additional real property rights would provide an additional 72 acres of vegetative buffer and mitigation areas.

The abutments of the dam will be located in interbedded limestones and shales belonging to the Pennsylvanian age Kansas City group. These units are exposed at the surface or blanketed by thin layers of Lagonda, Armster, and Ladoga soils. Bedrock is shallow over most of the proposed site. Four bedrock joint sets have been identified. Planning stage foundation investigations were conducted using 13 backhoe pits and 8 drill holes. Three drill holes were angle-drilled into the abutments and pressure tested. No significant leakage problems were detected below the weathered, fractured bedrock surface. Considering that this will be a water supply and recreational reservoir, further geologic and drilling investigations will need to be conducted prior to final design and construction.

Borrow material for the embankment fill will be obtained from within the permanent pool area of the reservoir and from excavation of the emergency spillway. These materials were sampled during the planning investigation and were found by soil mechanics testing to be adequate for use in construction. Due to the relatively shallow bedrock in the pool area, further drilling and delineation of borrow areas will need to be conducted prior to construction.

Because the reservoir will provide a source for rural water supply, recreation, and fish and wildlife habitat, additional land treatment and technical assistance components have been targeted toward potential sources of water quality impairment located within the drainage area.

Basic recreational facilities are planned for the reservoir site. Included will be facilities for fishing, picnicking, trails, and restrooms. Table 2B displays the basic facilities included and costs associated with the recreational development at the reservoir. Facilities will be designed according to ADA specifications for use by persons with disabilities. Appropriate state and federal guidelines for safety, health, and sanitation will be followed. A map of the planned recreational developments is included in Appendix B.

PERMITS AND COMPLIANCE

A Federal Clean Water Act, Section 404 permit will be obtained prior to construction in order to comply with the Act. Prior to construction, a Storm Water Management Discharge Permit will be obtained from the Missouri Department of Natural Resources, Water Pollution Control Program.

Procedures specified by the Fish and Wildlife Coordination Act were used to insure important fish and wildlife resources would not be lost.

This document was prepared to comply with the National Environmental Policy Act and the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies.

Project measure installation will be in compliance with applicable federal, state, and local laws and regulations. The Sponsors are responsible for securing all necessary permits, such as those for stormwater discharge, environmental pollution control, abatement, and access to public rights of way.

COSTS

Project costs, cost distribution, cost-share allocation, and average annual costs are listed in Tables 1, 2, 2a, 2b, 4, and 6. The watershed agreement presents the cost-sharing rates between the Watershed Protection and Flood Prevention Act, Public Law 83-566 funding, and other funds. All project costs are estimates and reflect the September 2001 price base. Construction costs for all proposed structural measures are based on established current costs for similar work. A 25 percent contingency allowance is included for construction costs. Caldwell County personnel provided landrights costs.

Engineering services for the structural measures include the cost of engineering analyses and designs, geologic investigations and analyses, archaeological evaluations, and other technical assistance needed to design and layout structural measures. Engineering costs also include investigations, preparation of plans and specifications, and inspection during construction. Project administration costs include contract administration, relocation assistance advisory services, and other related items. There is one anticipated relocation payment associated with structural measures in the plan. Caldwell County will provide the local Sponsors' share of costs. The Soil and Water Conservation District (SWCD) will not incur any costs.

INSTALLATION AND FINANCING

Planned Sequence of Installation

The installation of structural measures is planned and coordinated to be accomplished over a 4-year period (Refer to Table I). Funds are scheduled for both construction and technical assistance during this time period.

**TABLE I
SCHEDULE OF OBLIGATIONS**

Year	Item	P.L.- 566	Other	Total
1st	Financial Assistance			
	Structural	0	0	0
	Real Property	120,500	1,003,700	1,124,200
	Relocation Assistance	28,100	23,000	51,100
	Technical Assistance			
	Structural	50,000	0	50,000
Subtotal		198,600	1,026,700	1,225,300
2nd	Financial Assistance			
	Structural	0	0	0
	Real Property	0	0	0
	Relocation Assistance	0	0	0
	Technical Assistance			
	Structural	300,000	0	300,000
Subtotal		300,000	0	300,000
3rd	Financial Assistance			
	Structural	1,500,000	1,200,000	2,700,000
	Real Property	0	0	0
	Relocation Assistance	0	0	0
	Technical Assistance			
	Structural	300,900	77,000	377,900
Subtotal		1,800,900	1,277,000	3,077,900
4th	Financial Assistance			
	Structural	703,700	507,800	1,211,500
	Real Property	0	0	0
	Relocation Assistance	0	0	0
	Technical Assistance			
	Structural	354,800	60,000	414,800
Subtotal		1,058,500	567,800	1,626,300
TOTAL		3,358,000	2,871,500	6,229,500

Responsibilities

Local Sponsors will be responsible for project administration duties related to obtaining permits needed to install the works of improvement, providing relocation assistance advisory services, administrative functions connected with relocation payments, and contract administration.

NRCS will be responsible for project administration of Public Law 83-566 duties and will assist the local Sponsors with their contract administration responsibilities.

Contracting

The Sponsors will be responsible for coordinating with NRCS during the installation of structural measures. Project measures will be installed by contracts awarded and administered by the Sponsor, unless they request NRCS to administer the contracts.

Real Property and Relocations

Caldwell County will obtain landrights for Reservoir LO-1. Landrights will be obtained for approximately 362 acres of permanent pool, 62 acres of temporary pool, 80 acres for the embankment and spillway, and an additional 191 acres for buffer areas. Construction of the reservoir will require the relocation of one residence.

Sponsors will acquire all landrights in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, 84 Stat 1894, 42 U.S.C. 4601 et seq.), and implementation regulations issued by the U.S. Department of Agriculture (7 CFR 21).

Cultural Resources

Funds are included in the recommended plan for surveys which identify the actual nature and distribution of historic properties. Funds will also be available for the recovery of information from archaeological and historic sites listed, or eligible for listing, on the National Register of Historic Places.

Significant cultural resources identified during project implementation will be avoided or preserved in place to the fullest practical extent. If significant cultural resources cannot be avoided or preserved, pertinent information will be obtained prior to construction.

In the event of a significant cultural resource discovery during construction, appropriate notice will be made by the NRCS to the State Historic Preservation Office and the Advisory Council on Historic Preservation. Consultation and coordination have been, and will continue to be, used to insure the provisions of the National Historic Preservation Act, as amended, and all other applicable cultural resources legislation have been met. The NRCS will take action as prescribed in NRCS GM 420, part 401, to protect and/or recover any significant cultural resources discovered during construction.

Financing

Federal assistance will be provided under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566, 83rd Congress, 68 Stat. 666), as amended. The balance of funds will be furnished by the Sponsors. The voters of Caldwell County approved a 0.5 percent sales tax on August 6, 2002, to assist in funding the local match for project installation.

All construction and engineering services costs allocated to flood prevention will be paid with Public Law 83-566 funds. Construction and engineering services costs allocated to fish, wildlife, and recreational development are shared jointly by Public Law 83-566 funds and other funds. Caldwell County will be responsible for securing project costs other than Public Law 83-566 funding. Funds provided by Caldwell County will be derived through general taxing authorities, general revenue bonds, general obligation bonds, and/or non-federal grants.

Project administration costs will be paid by the NRCS and Caldwell County as they are incurred.

Construction and engineering service costs for the design and installation of recreational development facilities are specific costs allocated to these purposes and will be shared by the NRCS and Caldwell County.

Landrights costs for the multiple-purpose reservoir will be paid by Caldwell County. Funds to finance the local share may be derived through general taxing authorities, general revenue bonds, general obligation bonds, and/or non-federal grants.

Conditions for Providing Assistance

Federal assistance is subject to the appropriation of funds and the accrual of Sponsor secured landrights and permits necessary for the installation of project measures.

Before construction can begin on the reservoir, 75 percent of the drainage area must be adequately protected from erosion. Any exception to this must be approved by the NRCS State Conservationist.

OPERATION, MAINTENANCE, AND REPLACEMENT

Operation

Operation is the administration, management, and performance of any services needed to insure proper functioning of a measure throughout its evaluated life. This includes such items as periodic inspections, reports, and necessary labor.

Maintenance

The maintenance of project measures is divided into annual and periodic. Annual maintenance is the regular service required on a measure to prevent deterioration and insure consistent functioning. It includes controlling the growth of undesirable vegetation; managing desirable vegetation through mowing, pruning, trimming, and fertilization; and inspecting the measure.

Periodic maintenance is required on a recurring basis. It includes revegetation; repairing fences; and repairing concrete, steel, or earthen parts of structural measures. It also includes repairing significant erosion and other storm damages. Damages to completed measures caused by normal deterioration, drought, flooding by storm events in excess of design criteria, or vandalism is considered maintenance regardless of when it occurs.

Replacement

Replacement is required when a component has a shorter performance life span than the life span of the project. Replacement includes situations where a component is damaged by storms or abuse. Continued effectiveness of measures must be assured throughout the life of the project. The dam, water intake tower, raw water line, and recreational facilities each have a 100-year life.

Sponsors' Responsibilities and Costs

The local Sponsors accept responsibility for operation, maintenance, and replacement (OM&R) on structural measures in two stages. The first stage begins upon completion of construction and approval by the Sponsors and NRCS. The second stage begins following the establishment of

vegetation, which usually occurs within two years after construction is completed. The Sponsors' responsibility extends throughout the life of the project, until the measure or practice is modified to remove potential risk of loss of life and property, or as may be required by federal, state, or local laws.

The annual OM&R costs for flood prevention; agricultural water management (rural water supply); and fish, wildlife, and recreational development are estimated to be \$2,200, \$4,000, and \$19,800 respectively. (Refer to Table 4). Caldwell County will be responsible for the operation and maintenance of the reservoir embankment and appurtenances and all recreational facilities. They will be responsible for replacement of any items relative to the embankment and recreational facilities, as the need arises. Recreational facilities and costs are itemized in Table 2B.

Plantings will be maintained in a manner to preserve their wildlife values. Mowing, prescribed burning, and restricted grazing are a few of the management options the Sponsors can select. The embankment and spillway will be limed and seeded as needed for proper vegetative growth. Inspections should be made after major storm events. Unscheduled maintenance may be necessary to remove trash and repair damages.

Operation, Maintenance, and Replacement Agreement

A specific operation, maintenance, and replacement agreement will be made for each structural measure prior to signing landrights, relocation, or project agreements. Agreements will provide for inspections, reports, and procedures necessary for the performance of maintenance items. The agreements will include specific provisions for retention, use, and disposal of property acquired with Public Law 83-566 assistance. An OM&R plan will be prepared for each structural and nonstructural measure.

Operation, maintenance, and replacement requirements will be determined for each measure. These requirements will be covered in the operation, maintenance, and replacement plan attached to, and made part of, the operation, maintenance, and replacement agreement.

Operation, Maintenance, and Replacement Inspections

Inspections are necessary to ensure that installed measures are safe and functioning properly. Inspections should review and document the adequacy of operation, maintenance, and replacement activities; identify needed operation, maintenance, and replacement work; describe any unsafe conditions; specify means of relieving unsafe work; set action dates for performing corrective actions; and review hazard classification of the dam.

The local Sponsors are responsible for making inspections. Inspections will be made annually, as a minimum, for the life of a practice or as specified in the operation, maintenance, and replacement agreement. The NRCS may, depending on the availability of resources, assist the Sponsors with their inspections. Inspections will be conducted in accordance with the NRCS National Operation and Maintenance Manual and Missouri Supplement.

The embankment, water intake tower, raw water line, and recreational facilities are to be inspected annually on a regularly scheduled basis; during or immediately following the initial filling of the reservoir; and during or immediately following major storms, earthquakes, or other occurrences which could adversely affect the structural measures.

LAND USE AND TREATMENT

The watershed has nearly 1,500 acres currently in the USDA-Conservation Reserve Program (CRP). CRP expiration dates range from 2005 to 2015. Bringing these lands back into crop production after expiration from CRP could significantly increase the need for land treatment to protect water quality of the water supply reservoir. NRCS and the Sponsors will encourage continued and expanded use of the CRP and similar programs to protect the entire watershed.

Maintaining water quality to meet state standards is an important concern for the proposed Reservoir LO-1. Soil erosion, off-site sediment damages, and agricultural non-point pollution can be reduced through education of producers and landowners and voluntary implementation of conservation practices. Federal, state, and local on-site septic system, stormwater control, and soil erosion regulations will also reduce negative environmental impacts in the watershed.

Land treatment for water quality protection will be improved on agricultural land through existing Natural Resources Conservation Service (NRCS), Soil and Water Conservation District (SWCD), Missouri Department of Natural Resources (MDNR), Missouri Department of Conservation (MDC), and Environmental Protection Agency (EPA) technical, financial, and educational assistance programs. Small public water supply watersheds, such as the Little Otter Creek Watershed, are eligible for the Missouri Conservation Reserve Enhancement Program (MoCREP). MoCREP can be used to protect water quality through incentive payments to convert cropland to permanent vegetative cover.

Residential housing on small-acre lots may increase due to development along the Interstate 35 corridor, the recent upgrade of U.S. Highway 36 to four lanes, potential increases in jobs west of Caldwell County, and increased recreational opportunities through the PL-566 project. Although the rural setting will remain and increases in residential development will not impact a significant portion of the watershed, the Sponsors will encourage the installation of state or county-certified on-site septic systems.

TABLE 1
ESTIMATED INSTALLATION COSTS
(dollars)^a

Installation Cost Item	Unit	Amount	P.L.-566 Funds Nonfederal Land	Other Funds Nonfederal Land	Total
			NRCS ^b		
Structural Measures					
Multiple-Purpose Reservoir	No.	1	2,819,000	2,332,500	5,151,500
Recreational Facilities			181,500	181,500	363,000
Water Intake Tower			195,000	195,000	390,000
Raw Water Line			162,500	162,500	325,000
Subtotal (Structural)			3,358,000	2,871,500	6,229,500
TOTAL			3,358,000	2,871,500	6,229,500

a. Price Base September 2001

b. Federal agency responsible for assisting in installation of works of improvement.

TABLE 2
ESTIMATED COST DISTRIBUTION - STRUCTURAL MEASURES
 (dollars)^a

	Installation Costs - P.L. 566 Funds						Installation Costs - Other Funds						Total Installation Costs
	Const. ^b	Eng. Services ^c	Real Property Rights	Reloc. Pymnts	Project Admin.	Subtotal	Const. ^b	Eng. Services ^c	Real Property Rights	Reloc. Pymnts.	Project Admin.	Subtotal	
Structural Measures													
Multiple-Purpose Reservoir	1,777,200	673,000	120,500	28,100	220,200	2,819,000	1,281,300	0	1,003,700	23,000	24,500	2,332,500	5,151,500
Recreational Facilities	151,500	18,000	0	0	12,000	181,500	151,500	18,000	0	0	12,000	181,500	363,000
Water Intake Tower	150,000	33,000	0	0	12,000	195,000	150,000	33,000	0	0	12,000	195,000	390,000
Raw Water Line	125,000	27,500	0	0	10,000	162,500	125,000	27,500	0	0	10,000	162,500	325,000
TOTAL	2,203,700	751,500	120,500	28,100	254,200	3,358,000	1,707,800	78,500	1,003,700	23,000	58,500	2,871,500	6,229,500

a. Price Base September 2001

b. Includes \$23,000 for mitigation and \$92,000 for cultural resources

c. The Sponsors and NRCS will bear the cost of construction inspection that each incurs, estimated to be \$25,000 and \$240,000 respectively

TABLE 2A

a. Price Base September 2001

TABLE 2B
ESTIMATED CONSTRUCTION COSTS
RECREATIONAL FACILITIES AND WILDLIFE HABITAT DEVELOPMENT
(dollars)^a

Item	Unit	Number ^b	Unit Cost	Construction Cost
Nature Trail, 8 feet wide	miles	1	85,000	85,000
Parking Lots, 30 car	each	1	10,000	10,000
Restroom Facilities, ADA	each	2	15,000	30,000
ADA Access	feet	150	10	1,500
Trash Receptacles	each	4	200	800
Concrete Picnic Tables w/grills	each	6	1,500	9,000
Benches	each	5	400	2,000
Regulation Display Board	each	2	1,000	2,000
Entrance Signs	each	2	1,000	2,000
Boat Ramp, 16 feet wide				
Concrete Ramp	feet	100	100	10,000
Gravel Approach and Turn Around	feet	300	15	4,500
Grading	feet	300	10	3,000
ADA Loading Platform	each	1	10,000	10,000
Shelterhouse	each	1	20,000	20,000
Concrete Picnic Tables	each	6	1,000	6,000
ADA Access	feet	100	10	1,000
Fishing Pier/Platform	each	1	3,200	3,200
ADA Access	feet	100	10	1,000
Access Road, 24 feet wide				
Gravel	feet	2,500	15	37,500
Grading	feet	2,500	10	25,000
Subtotal				263,000
Contingency, 15%				39,500
Subtotal				302,500
Engineering Services				36,000
Project Administration				24,000
Real Property Rights				0
Subtotal, NRCS				181,500
Subtotal, Other				181,500
TOTAL CONSTRUCTION				363,000

a. Price Base September 2001

b. Estimated quantity subject to variations at time of detailed design

**TABLE 3
STRUCTURAL DATA
WITH PLANNED STORAGE CAPACITY**

	Unit	LO-1	Total
Class of Structure		C	XXXX
Seismic Zone		1	XXXX
Controlled Drainage Area	Acres	4,825	4,825
Total Drainage Area	Acres	4,825	4,825
Runoff Curve No. (1-day) (AMC II)		80	XXXX
Time of Concentration (Tc)	Hours	2.34	XXXX
Elevation			
Top of Dam	ft	868.1	XXXX
Crest Auxiliary Spillway	ft	860.6	XXXX
Crest Low Stage Inlet	ft	855.1	XXXX
Auxiliary Spillway Type		Vegetative	XXXX
Auxiliary Spillway Bottom Width	ft	300	XXXX
Auxiliary Spillway Exit Slope	% slope	5.0	XXXX
Maximum Height of Dam	ft	76.0	XXXX
Volume of Fill	Cu. Yd.	768,000	768,000
Total Capacity ^a	Ac-ft	8,744	8,744
Sediment Submerged	Ac-ft	684	684
Sediment Aerated	Ac-ft	120	120
Floodwater Retarding	Ac-ft	2,120	2,120
Beneficial Use	Ac-ft	5,820	5,820
Surface Area			
Sediment Pool	Acres	81	81
Floodwater Retarding	Acres	424	424
Beneficial Use	Acres	362	362
Principal Spillway Design			
Rainfall Volume (1-day)	Inches	7.4	XXXX
Rainfall Volume (10-day)	Inches	13.0	XXXX
Runoff Volume (10-day)	Inches	8.2	XXXX
Capacity of Low Stage (max.)	Ft 3/s	216.7	XXXX
Dimensions of Conduit	Inches	36	XXXX
Type of Conduit		RCP	XXXX
Frequency Operation – Auxiliary Spillway	% chance	1.0	XXXX
Auxiliary Spillway Hydrograph			
Rainfall Volume	Inches	11.2	XXXX
Runoff Volume	Inches	8.7	XXXX
Storm Duration	Hours	6.0	XXXX

Velocity of Flow (Ve)	Feet/sec	8.0	XXXX
Maximum Water Surface Elevation	feet	862.9	XXXX
Freeboard Hydrograph			
Rainfall Volume	Inches	27.3	XXXX
Runoff Volume	inches	24.5	XXXX
Storm Duration	Hours	6.0	XXXX
Velocity of Flow (Ve)	Feet/sec	17.2	XXXX
Maximum Water Surface Elevation	Feet	868.1	XXXX
Capacity Equivalents			
Sediment Volume	Inches	2.0	XXXX
Floodwater Retarding Volume	Inches	5.3	XXXX
Beneficial Volume	Inches	14.5	XXXX

a.Crest of auxiliary spillway

TABLE 4
ESTIMATED AVERAGE ANNUAL COSTS
(dollars) ^a

Evaluation Unit	Amortization of Installation Cost	Operation Maintenance and Replacement Cost	Total
STRUCTURAL			
Multiple Purpose Reservoir LO-1	382,600	26,000	408,600
TOTAL	382,600	26,000	408,600

a. Price Base September 2001, discounted at 6.125 percent interest for 100 years

TABLE 5
ESTIMATED AVERAGE ANNUAL DAMAGE REDUCTION BENEFITS
(dollars) ^a

Item	Estimated Average Annual Damage		Damage Reduction Benefits	
	Without-Project	With-Project	Average Annual ^b	Percent Reduction
Floodwater				
Crop and Pasture	41,500	2,000	39,500	95%
Fence	5,100	200	4,900	96%
Debris	2,300	100	2,200	96%
Road and Bridge	14,000	0	14,000	100%
TOTAL	62,900	2,300	60,600	96%

a. Price Base September 2001

TABLE 6
COMPARISON OF BENEFITS AND COSTS
 (dollars)^a

Evaluation Unit	Crop and Pasture Benefits	Other Ag. Benefits	Debris	Road and Bridge Benefits	Rural Water Management Benefits	Recreation Benefits	Average Annual Benefits Total	Average Annual Costs Total ^b	Cost Benefit Ratio
STRUCTURAL									
Multiple Purpose Reservoir LO-1	39,500	4,900	2,200	14,000	245,200	266,200	572,000	408,600	
TOTAL	39,500	4,900	2,200	14,000	245,200	266,200	572,000	408,600	1.40

a. Price Base September 2001

b. From Table 4

GLOSSARY

Acquisition and Relocation (Buyout): Purchase and/or removal (relocation or demolition) of properties from floodprone areas. Process includes purchase of real property, appraisals, closing costs, moving expenses, demolition, and salvage removal.

Average Annual Benefits: The difference between the without-project average annual damages and the with-project average annual damages plus other benefits, such as recreation.

Average Annual Cost: The capital of initial cost amortized to an annual cost plus the necessary operation, maintenance, and replacement cost.

Conservation Practice or Measure: A technique or management based on published standards and used to control erosion, conserve water, protect plants, or generally improve soil, water, air, plant, and animal resources.

Cost-sharing: Financial assistance from a federal, state, or local agency to a land user or project sponsor for installation of soil and water conservation or watershed project measures.

Floodplain: Level land adjacent to a stream or river channel which is covered with water when the channel overflows its banks at flood stages.

Floodwater Damage: The economic loss caused by floods, including damage by inundation, erosion, scour, or sediment deposition on floodplains. Floodwater damages result from physical damages or losses, emergency costs, and business or financial losses. Evaluation may be based on the cost of replacing, repairing, or rehabilitating.

Floodwater Damage Reduction Measures: Any land treatment, structural, or nonstructural measures that decrease the damage from floodwater.

Habitat Suitability Index (HSI): A number representing the comparison between present or projected habitat quality and the optimum conditions possible in the area where a specific animal lives.

Habitat Unit (HU): A value derived from multiplying the Habitat Suitability Index (HSI) for an evaluation species by the size of the area for which the HSI was calculated. The HU provides a standardized basis for comparing habitat changes over time and space.

Incremental Analysis: A systematic approach to formulating cost-effective resource protection. The technique involves layering and comparing protection levels of elements that address each of the watershed project purposes.

Landrights: Any interest acquired or permission obtained to use land, buildings, structures, or other improvements; includes the acquisition of land by fee title or certain designated rights to the use of land by perpetual easement; also includes the costs of modifying utilities, roads, and other improvements.

NED Plan (National Economic Development Plan): A plan that reasonably maximizes net national economic development benefits.

Nonstructural Measures: Project activities which modify the susceptibility of land, people, and property to flood damages. May include flood warning systems, flood proofing, and the acquisition and relocation of residential and commercial properties.

Ongoing Programs: Existing federal, state, and local programs, other than PL-566, which provide technical assistance, financial, and/or educational assistance for the installation of land treatment practices.

Riparian Areas: Land adjacent to creeks, streams, and rivers which includes the channel itself, its floodplain, streambanks, and upland areas which are often wooded.

Structural Measures: Project works of improvement such as dams, levees, diversions, channels, or other constructed devices, installed and maintained for flood prevention; drainage; irrigation; recreation; fish and wildlife; municipal, industrial, or rural water supply; water quality management; or other agricultural water management purposes. Structural measures are installed, operated, and maintained by a project sponsor.

Technical Assistance: Help provided to individuals, groups, and units of government on opportunities, potentials, and problems having to do with soil and water resources. May include program formulation, planning, application, and maintenance.

T Value/Tolerable Soil Loss: Expressed as the erosion factor "T" in the universal soil loss equation; an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without reducing crop productivity; rate expressed in tons per acre per year; individual value assigned to each soil mapping unit.

Watershed: The area contained within a drainage divide above a specified point on a creek, stream, river, or other water body.

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REVIEW PROCESS

The draft Watershed Plan and Environmental Impact Statement received a technical review and was concurred in by USDA-Natural Resources Conservation Service (NRCS) specialists who have responsibility for agronomy, biology, cultural resources, economics, engineering, forestry, geology, hydrology, soils, and water quality. This review was followed by an interagency review of the document by state and federal agencies and groups outside the NRCS.

APPENDIX A

Letters and Comments on Draft Watershed Plan and Environmental Impact Statement

The draft Little Otter Creek Watershed Plan - Environmental Impact Statement was sent to the following agencies, organizations, and individuals in compliance with the P.L.-566 interagency review provisions:

Caldwell County Soil and Water Conservation District, Ron McElwee, Chairperson
Caldwell County Commission, Dale Hartley, Presiding Commissioner
Commission on Intergovernmental Cooperation, Ewell Lawson, Director
Federal Emergency Management Agency, Dick Hainje, Regional Director
Missouri Audubon, Roger Still, Executive Director
Missouri Department of Conservation, John D. Hoskins, Director
Missouri Department of Conservation, Norm Stucky, Fisheries Administrator
Missouri Department of Conservation, Dan Witter, Policy Coordination Chief
Missouri Department of Economic Development, Joe Driskill, Director
Missouri Department of Natural Resources, Claire Blackwell, Historic Preservation Officer
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Missouri Department of Natural Resources, Stephen Mahfood, Director
Missouri Department of Transportation, Kevin Keith, Chief Engineer
Missouri Department of Transportation, Mark Kross, Preliminary Studies Division
Missouri Soil and Water Districts Commission, Elizabeth Brown, Chairperson
Missouri State Capitol, Honorable Bob Holden, Governor
Missouri State Representative, Randall Relford
Missouri State Senator, David Klindt
Missouri State Senator, James Mathewson
National Wildlife Federation, Legislative Representative
Natural Resources Defense Council, Inc.
Sierra Club
State Emergency Management Agency, Jerry Uhlmann, Director
U.S. Army Corps of Engineers, District Engineer, Kansas City District
U.S. Department of Commerce, NOAA, Director, Ecology & Conservation Office
U.S. Department of Housing & Urban Development, Macie Houston, Regional Director Great Plains
U.S. Department of Interior, Secretary of the Interior
U.S. Department of Interior, Office of Environmental Project Review, Director
U.S. Department of Interior, Fish and Wildlife Service, Charlie Scott, Field Supervisor
U.S. Department of Transportation, U.S. Coast Guard G-MPSI, Coordinator, Water Resources
U.S. Environmental Protection Agency, Office of Federal Activities, Director

U.S. Environmental Protection Agency, Regional Administrator, Region VII
U.S. House of Representatives, Honorable Sam Graves
U.S. Senate, Honorable Christopher Bond
U.S. Senate, Honorable Jean Carnahan
USDA, Office of Advocacy & Enterprise, Director
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USDA-NRCS, Pat Hufford, ASTC (FO), St. Joseph Area Office
USDA-NRCS, Dave Owen, District Conservationist, Ray County Field Office
USDA-Rural Development, Greg Branum, State Director



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

AUG 30 2002

Mr. Roger A. Hansen, State Conservationist
United States Department of Agriculture
Parkade Center, Suite 250
601 Business Loop 70 West
Columbia, MO 65203

Dear Mr. Hansen:

RE: Draft Watershed Plan - Environmental Impact Statement for the Little Otter Creek
Watershed in Caldwell County, Missouri

The Environmental Protection Agency has reviewed the Draft Environmental Impact Statement (DEIS) for the watershed project mentioned above which is located in Caldwell County, Missouri. Our review is provided pursuant to the National Environmental Policy Act (NEPA) 42 U.S.C. 4231, Council on Environmental Quality (CEQ) regulations 40 C.F.R. Parts 1500-1508, and Section 309 of the Clean Air Act (CAA). The Draft EIS was assigned a CEQ number of 20310.

Based on our review of the project and the degree of our comments, the EPA has rated the Draft Environmental Impact Statement for this project "LO", which means Lack of Objections. A copy of EPA rating definitions is included as an attachment. We believe that the proposed project within the Little Otter Creek Watershed can meet the overall purpose and need of the project while presenting minimal environmental impact to the area. However, we would appreciate more clarification or development of the following issues in the Final Environmental Impact Statement (FEIS):

- 1) The DEIS reports that 96% of the watershed is privately owned, with 69 farms in the project area. We understand that all necessary acquisitions will comply with the Uniform Relocation and Assistance and Real Property Acquisition Policies Act, however the DEIS is unclear on exactly how many and what type of property is being acquired (e.g. residential, farmland, commercial). Evaluation of the types of properties being acquired versus the local availability of replacement real estate could assist in predicting secondary impacts of the relocations.
- 2) The project includes a 319-acre mitigation area around the reservoir to provide filter benefits for agricultural non-point pollutants. The DEIS states that various educational assistance programs will be used to help land owners apply conservation and

environmentally protective agronomic practices. EPA believes that the Final EIS could be a good vehicle to convey specific program information such as MoCREP to those persons that will be expected to implement practices necessary to meet project goals. EPA recommends that the FEIS provide an array and description of available incentive or cost-share programs that could be utilized within this watershed.

3) The proposed reservoir dam has been classified as a class (c) hazard due to its location and the degree of damage it would cause if it were to fail. The EPA recommends that the Final EIS describe measures that will be implemented in order to avoid unsafe conditions within the breach inundation zone (i.e restrictions to development, easements...).

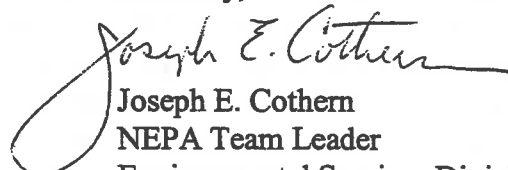
4) Table G, page 32 indicates that the Recommended Plan is expected to attract 60,000 recreational visits annually. EPA believes that this indirect impact should be evaluated for environmental consequences per 40 CFR Part 1502.16.

5) The stream section to be lost is of good quality and supports a diverse fish population. The installation of a reservoir will affect the movement of certain fish species, as well as retard food and nutrient transport to downstream organisms. The EPA suggest that all proposed mitigation to maintain aquatic habitat be coordinated with biologists at the Missouri Department of Conservation to ensure that the impoundment is stocked with appropriate fish species.

6) The Natural Resources Conservation Service estimates that 109 acres of wetlands will be created. The EPA would like to stress the importance of allowing for creation of shallow wetland areas (<5, <3, <1 feet deep) to ensure the growth of wetland vegetation and to sustain amphibian populations in the area.

If you have any questions regarding the rating or the individual comments please contact Mr. Nicholas Rocha at (913) 551-7805.

Sincerely,


Joseph E. Cothorn
NEPA Team Leader
Environmental Services Division

Enclosure



Natural Resources Conservation Service
Parkade Center, Suite 250, 601 Business Loop 70 West
Columbia, Missouri 65203

February 5, 2003

Joseph E. Cothorn, NEPA Team Leader
Environmental Services Division
U.S. Environmental Protection Agency – Region VII
901 North 5th Street
Kansas City, Kansas 66101

Dear Mr. Cothorn:

This letter responds to your comments on the Draft Little Otter Creek Watershed Plan-EIS.

Comment 1 – As stated in the Plan-EIS, the Sponsors will secure landrights to 695 acres for installation and maintenance of multiple purpose Reservoir LO-1. These properties are rural, agricultural lands consisting of cropland, pasture, hayland, forestland, brush, water, and other. Acquisition of only one residential property (mobile home) is anticipated. Secondary impacts resulting from relocations and the need for replacement real estate will be very minimal.

Comment 2 – Narrative concerning some potential programs that may provide financial and educational assistance to improve watershed protection has been added to the "Formulation and Comparison of Alternatives" section of the plan. We prefer not to include in the document specific program, incentive, or cost-share information in light of the fact that, over time, regulations change, programs are ended, or new programs are created.

Comment 3 – The Recommended Plan section of the Plan-EIS states that Class C structures are designed to safely convey the runoff from the probable maximum precipitation (PMP) storm (27.3 inches in 6 hours) through the structure without extensive damage. Chances of the impoundment breaching are extremely small. To further avoid the possibility of creating unsafe conditions, future development within the breach inundation zone will be in accordance with the regulations of the federal floodplain management and flood insurance programs.

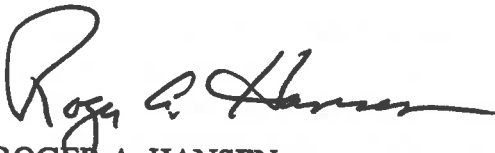
Comment 4 – Environmental consequences were evaluated as per NEPA. NRCS, in consultation with MDC, USFWS, the project Sponsors, and other appropriate state and federal personnel, will develop mitigation plans prior to obtaining the necessary project permits and the start of construction activities. Mitigation plans will address all impacted resources including fisheries and wildlife habitats, wetlands, loss of stream habitat, effects of increased annual user days, and will establish components of and management procedures for acquired lands and mitigation areas. Mitigation areas will adequately compensate for the various habitats impacted and emphasize the native species that require these habitat types.

Comment 5 – NRCS will work with the appropriate state and federal personnel, as well as the project Sponsors, to develop a mitigation plan for both the loss of stream habitat resulting from inundation and the impacted stream reach below the reservoir outlet. NRCS will also work with the Sponsors

and MDC to develop a management plan for the reservoir. This will include guidelines for stocking appropriate fish species.

Comment 6 – NRCS agrees with your comment stressing the importance for creating shallow wetland areas. Much of the 109 acres of wetlands created in the reservoir permanent pool will consist of shallow water areas. Plans call for creating undulating bottoms in borrow areas that will result in various water depths resulting in a diverse wetland habitat suitable to a wide array of species. An additional 42 acres of seasonally flooded, shallow, wetland habitat will be created in the reservoir's temporary pool.

Thank you for your review and comments of the draft Plan-EIS. Your office will receive a copy of the final plan when it is completed. If there are further questions or comments, please contact Harold Deckerd, Assistant State Conservationist at (573) 876-0912.

A handwritten signature in black ink, appearing to read "Roger A. Hansen". The signature is fluid and cursive, with a large initial "R" and "H".

ROGER A. HANSEN
State Conservationist

cc: Harold Deckerd, ASTC, NRCS, Columbia, MO
Rob Cheshier, Geologist, NRCS, Columbia, MO



DEPARTMENT OF THE ARMY
KANSAS CITY DISTRICT, CORPS OF ENGINEERS
700 FEDERAL BUILDING
KANSAS CITY, MISSOURI 64106-2896

AUG 15 2002

REPLY TO
ATTENTION OF:

August 12, 2002

Regulatory Branch
(200201809)

Mr. Roger A. Hansen
State Conservationist
USDA, Natural Resources Conservation Service
Parkade Center, Suite 250
601 Business Loop 70 West
Columbia, Missouri 65203-2546

Dear Mr. Hansen:

This letter is in response to your June 21, 2002, request that the Department of the Army (DA), Corps of Engineers, participate in the review of the draft Watershed Plan-Environmental Impact Statement (plan-EIS), for construction of a earthen dam in the Little Otter Creek Watershed, in Caldwell County, Missouri. The plan-EIS study area falls within the Corps of Engineers, Kansas City District (KCD), regulatory program boundary and a DA permit will be required prior to starting the described work in waters of the United States.

The Corps of Engineers has regulatory jurisdiction over all waters of the United States. Discharges of dredged or fill material in waters of the United States, including wetlands, require prior authorization under Section 404 of the Clean Water Act (33 USC 1344). Our preliminary regulatory determination is that the study area described in the plan-EIS encompasses waters of the United States. We will complete a jurisdictional determination for the project and provide you with a jurisdictional appeal form when you request a DA permit for the project.

Based on our review of the draft plan-EIS, we are providing the following comments:

1. The project's purpose and need, stated as the construction of one multiple-purpose reservoir to provide the county with a single emergency water supply, with features included to enhance wildlife habitat, recreation and local flood protection, sufficiently serves as the basis for a DA permit 404(b)(1) alternative analysis. However, although we agree with the strategy described to evaluate the alternatives, we suggest that you include a larger number of reasonable practicable alternatives to cover the full spectrum of the project. The limited range of alternatives described in the plan-EIS, with and without project, does not allow the opportunity to demonstrate that the selected alternative constitutes the least environmentally damaging practicable alternative. Broadening the range of potential alternative plans and/or sites is particularly important due to Little Otter Creek's high water quality values and unique geomorphic features; which display a mixture of bedrock, gravel and cobble substrate and wide

riparian corridors, allowing for a more diverse fish community than found elsewhere in the county. Also, the National Environmental Policy Act (NEPA) procedurally requires that all reasonable alternatives, not just those available to the applicant, be considered in the process of alternative analysis.

2. We recommend that you increase the level of biological analysis used in the plan-EIS to meet NEPA and DA 404(b)(1) requirements. Stream impacts and loss of unimpaired water flow should be incorporated in the alternative analysis of the plan-EIS prior to addressing this issue in the DA permit process. Also, we suggest that the procedure used to identify wetlands in the project area include a review of Farm Services Agency (FSA) agricultural wetland inventories. We suggest that you analyze wetland temporal loss downstream from the proposed dam and wetland functional changes that may be caused by the project to substantiate the statement in the plan-EIS that no net loss of wetlands will result from the project.

3. Mitigation outlined in the plan-EIS is designed primarily to offset project related losses to upland habitat. Specifically, we do not consider that mitigation management units developed to meet habitat requirements for the northern bobwhite quail (*Colinus virginianus*) are adequate to offset the wide range of environmental impacts associated with this project. We recommend that you develop mitigation that incorporates both upland and aquatic features that will offset project impacts to waters of the United States and address issues relevant to the DA permit process. We consider both the excavation and discharge of dredged or fill material in stream channels and the conversion/inundation of open-water lotic systems as losses of waters of the United States.

4. There is insufficient information in the plan-EIS to support the statement that the scope and nature of the project is not likely to adversely impact the Federally-listed Indiana Bat (*Myotis sodalis*). The plan-EIS does not sufficiently address impacts, both immediate and cumulatively, that the project may have within the watershed to potentially jeopardize this species.

5. We recommend that you include a statement concerning the issuance or denial of a DA Section 404 permit for this project in the paragraph entitled "Risk and Uncertainty", located on page 30 of the plan-EIS.

6. We recommend that the watershed agreement between the Caldwell County Commission, Caldwell County Soil and Water Conservation District and the Natural Resources Conservation Service be amended to include terms for acquisition and maintenance of mitigation areas within the watershed that may be necessary to satisfy conditions stipulated in a proposed DA permit.

If you have any questions concerning our comments to the draft plan-EIS, please feel free to write me or call James A. Ptacek at 573-634-4837 (FAX 573-634-7960).

Sincerely,

A handwritten signature in cursive script, reading "Joseph S. Hughes". The signature is written in dark ink and is positioned above the printed name and title.

Joseph S. Hughes
Acting Chief, Regulatory Branch
Operations Division



Natural Resources Conservation Service
Parkade Center, Suite 250, 601 Business Loop 70 West
Columbia, Missouri 65203

February 5, 2003

Joseph S. Hughes, Acting Chief
Regulatory Branch, Operations Division
Department of the Army
Kansas City District, Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106-2896

Dear Mr. Hughes:

This letter responds to your comments on the Draft Little Otter Creek Watershed Plan-EIS.

Comment 1 - Portions of the Plan-EIS have been supplemented with additional narratives. A new section entitled "Alternatives Considered but Eliminated from Detailed Study" has been added to the Formulation and Comparison of Alternatives portion of the Plan-EIS. The section entitled "Agricultural Water Management (Rural Water Supply)" in this same portion has also been expanded. Also, the section entitled "Agricultural Water Management (Rural Water Supply)" in the Watershed Problems and Opportunities portion has been supplemented. These sections now contain additional narratives and information from Allstate Consultants; Allgeier, Martin, and Associates; the Green Hills Regional Planning Commission; and the Missouri Division of Geological Survey and Water Resources.

This information details current water usage, projected usage, problems associated with obtaining water from other sources, consideration and dismissal of other sites in the watershed, and provides support for the elimination of other alternatives from detailed consideration. As an example, to pipe 1.2 million gallons of water per day from Smithville Lake would cost \$10,000,000 according to preliminary figures prepared by Allstate Consultants. This is not an economically defensible alternative considering that the recommended plan has a cost estimate of \$6,200,000. Also, the pipeline alternative would not address the other plan purposes, would environmentally impact an estimated 60 miles needed for installation, and would introduce great uncertainty as to the future availability and cost of such water.

Consequently, the recommended plan which creates a locally-controlled, regional, surface water supply and also fulfills other project purposes, is the only reasonable alternative identified and supported by the local Sponsors and the voters of Caldwell County.

Comment 2 - Impacts to Little Otter Creek, both the upstream reach to be inundated by the pools and the reach downstream that will be impacted by changes in flow regime, are addressed in various portions of the document. These sections have been edited and supplemented with additional information to provide better clarification. Narratives are found in the Problems and Opportunities section, the Formulation and Comparison of Alternatives section, and in the Recommended Plan section. Prior to obtaining the necessary project permits and the start of construction activities,

NRCS will conduct meetings with relevant state and federal personnel, as well as the project Sponsors, to discuss and prepare mitigation plans for areas to be impacted by project implementation.

As per your suggestion to include FSA agricultural wetland inventories, an additional wetland map will be added to Appendix D and a new Table (Wetlands Identified Within the Top of Dam Elevation) will be added to the Formulation and Comparison of Alternatives – Wetlands section.

As per your comment “We suggest that you analyze wetland temporal loss downstream from the proposed dam and wetland functional changes that may be caused by the project...”, we feel that based on the definition of a wetland under the Food Security Act there will be sufficient occurrences of flooding to sustain the wetlands in question. If the wetlands are flooded at least twice a year this would exceed the necessary water regime to classify these areas as wetlands under FSA. The FSA requirements are 50% chance of occurrence of flooding (one time in two years). Also, these areas pond water seasonally from rainfall and runoff from within the field and adjacent land. The intent of this structure, from a flood control perspective, is to detain water after a rainfall event and release it slowly over a longer period of time. Therefore, higher water levels in the stream will be maintained for a longer duration. This will provide a higher water table that will help maintain the hydrology of wetlands for a longer period of time.

Comment 3 – As described in the Investigations and Analyses Section of the DEIS, the tri-agency team, composed of biologists from MDC, USFWS, and NRCS, agreed to use WHAG that was developed by MDC. The WHAG software allowed us to assess the various habitat types to be impacted for 14 different species with niche requirements that represent all of these habitat types. Based on the field data collected, the tri-agency team agreed that the bobwhite quail habitat suitability index (HSI) would be used to assess the loss of the upland habitats to be impacted. The use of the quail HSI provided the greatest number of mitigation acres. These mitigation acres will not be developed solely for bobwhite quail, but rather will adequately compensate for the various habitats impacted and emphasize the species that require these habitat types. NRCS will develop a mitigation plan with MDC and the USFWS. Supplemental narrative will be added to the document to clarify these issues.

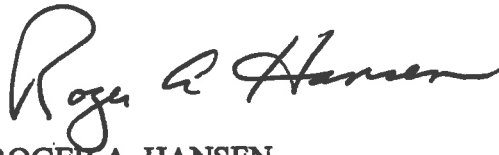
The wetland acres identified in the plan that will be impacted by the project are preliminary at this time and are based on the best available data using off-site methods. Prior to the start of construction, a certified wetland determination will be conducted on-site within the project area and these data will be used to obtain the necessary federal and state permits which will include mitigation for any wetland impacts.

Comment 4 – The language in the DEIS will be changed, to be consistent throughout the DEIS, regarding the Indiana bat to “The Indiana bat (*Myotis sodalis*) may occur in the watershed. In order to avoid adverse impacts to the Indiana bat the guidelines developed by the U.S. Fish and Wildlife Service for the conservation of the Indiana bat will be followed as per NRCS Biology Technical Note No. 17.”

Comment 5 – Comment noted. A reference to issuance of both the Department of the Army 404 and the Missouri Department of Natural Resources 401 permits has been included in the “Risk and Uncertainty” paragraph.

Comment 6 – Specific terms for acquisition of property and operation, maintenance, and replacement are not included in the Plan-EIS. However, the Sponsors will be required to comply with all policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act and must sign all necessary OM&R agreements. Such terms and agreements will be stipulated, agreed to, and signed by the appropriate parties prior to the signing of landrights, relocation, mitigation, and project agreements and prior to the commencement of construction activities.

Thank you for your review and comments of the draft Plan-EIS. Your office will receive a copy of the final plan when it is completed. If there are further questions or comments, please contact Harold Deckerd, Assistant State Conservationist at (573) 876-0912.

A handwritten signature in cursive script, reading "Roger A. Hansen".

ROGER A. HANSEN
State Conservationist

cc: Harold Deckerd, ASTC, NRCS, Columbia, MO
Rob Cheshier, Geologist, NRCS, Columbia, MO



MISSOURI DEPARTMENT OF CONSERVATION

Headquarters

2901 West Truman Boulevard, P.O. Box 180, Jefferson City, Missouri 65102-0180
Telephone: 573/751-4115 ▲ Missouri Relay Center: 1-800-735-2966 (TDD)

JOHN D. HOSKINS, Director

August 26, 2002

Mr. Roger Hansen
Natural Resources Conservation Service
Parkade Center, Suite 250
601 Business Loop West
Columbia, MO 65203

Dear Mr. Hansen:

Thank you for the opportunity to review and comment on the draft Watershed Plan-Environmental Impact Statement (Plan-EIS) that you are preparing for the Little Otter Creek Watershed, Caldwell County, Missouri. The Plan-EIS provides information related to the installation of one multiple-purpose reservoir to provide rural water supply, fish and wildlife habitat enhancement, recreational development, and flood prevention.

The Missouri Department of Conservation is mandated to protect/manage forest, fish, and wildlife resources of our state. Department staff members have finished their reviews; please find enclosed our comments and recommendations. Several comments are either in the form of questions or offers to provide technical assistance and we would like to meet with your staff to address them.

The Department appreciates the opportunity to provide comments. Mr. Gene Gardner is our contact person for this and other PL 83-566 authorized projects. He will be contacting your staff soon to arrange a meeting date. Please direct any questions to him at 573.751.4115, Extension 3353.

Sincerely,

for DANIEL J. WITTER, PH.D.
POLICY COORDINATION CHIEF

DJW:GG:dcl

Enclosure

c/enc: Norm Stucky, Ollie Torgerson, Steve Eder, John Fleming, Kyle Reno, Mitch Miller
COMMISSION

STEPHEN C. BRADFORD
Cape Girardeau

ANITA B. GORMAN
Kansas City

CYNTHIA METCALFE
St. Louis

HOWARD L. WOOD
Bonne Terre

ATTACHMENT – REVIEW COMMENTS
WATERSHED PLAN – ENVIRONMENTAL IMPACT STATEMENT
LITTLE OTTER CREEK WATERSHED
CALDWELL COUNTY, MISSOURI
August 12, 2002

General Comments

Impoundments constructed on small streams can have unintended effects on stream resources; they can alter the physical processes that shape and maintain stream channels, riparian areas, and aquatic communities. The Missouri Department of Conservation (MDC) recommends six Best Management Practices (BMPs) when planning new impoundments on ephemeral or intermittent streams. Please refer to the attached BMPs that were approved by the Fisheries Division, MDC on April 2, 2001.

Mitigation measures for this proposed project seem to be hinged upon use of the U.S. Fish and Wildlife Service's Habitat Evaluation Procedure (HEP). This widely accepted method is a useful tool for developing comparisons between study sites with and without the proposed development project; a HEP analysis is especially applicable to reservoir development projects. However, for your Little Otter Creek watershed plan, you have decided to use only the bobwhite quail as your indicator species. Although the Department supports any effort to establish suitable bobwhite quail habitat in hopes of increasing their numbers, the use of only the bobwhite quail as an indicator is inadequate to evaluate the scope of potential impacts to all wildlife habitats within the project watershed. The bobwhite quail is considered a grassland species, therefore, it is a good indicator to measure the quality of grassland habitats in context with bobwhite quail life requisites. However, the bobwhite quail is not a good indicator of forested habitat values because even the "highest quality" forest habitats will yield a relatively low suitability index rating in context with bobwhite quail habitat requisites. We recommend the use of forest habitat indicator species (e.g., black-capped chickadee, pileated woodpecker, gray squirrel) to evaluate impacts to forested habitats and additional species to evaluate changes in floodplain forests and forested wetlands (e.g., mink, wood duck). For assessing changes in aquatic communities (i.e., riverine to lacustrine) the channel catfish, creek chub, largemouth bass, or white crappie can be used as evaluation species.

A projected land ownership map would be very beneficial to work from.

Specific Comments and Questions

Page 5 - Other Project Benefits - Item#2 - "provide 60,000 annual public recreational visits" **compare to** Page 26 - Alternative 1- "supply 60,000 annual user days of fishing." **Recreational visits would include fishing, but should not be limited to fishing. Did you intend to estimate a total of 60,000 fishing trips or 60,000 fishing trips + all other recreational use trips?**

Page 27 - Alternative 1 - stream loss addressed during the 404 and 401 permit process. **MDC fisheries biologists request a coordination meeting to suggest mitigation measures for loss of stream habitat.**

Page 36 - Pre-Design Conference - MDC area biologist mentioned as the participant in this meeting. **In addition, an MDC fisheries management biologist should also participate in this meeting.**

Page 37 - Mitigation Features - flow augmentation. **Intermittent outflow, other than principle spillway flow, should be provided as discussed in BMP #5. However, who will be the responsible party for actually releasing water downstream to augment the flow? Who will prepare the criteria that will serve as a manual for creating certain flows at certain times? MDC biologists and engineers would like to meet with NRCS biologists and engineers to develop strategies and engineeringly feasible design criteria.**

Page 49 - Table 2, cost distribution for recreational facilities. **While MDC may participate in a CAP agreement, is the \$181,500 for installation costs from other funds a reliable cost estimate?**

Page 53 - Table 2B, Nature Trail. **A significant portion of the recreational facilities costs are tied up in the nature trail, will NRCS be funding this amount or will MDC involvement/support be required?**

Page 53 - Table 2B, Fishing Dike. **MDC is concerned that this feature will be acceptable to the public, knowing that MDC often provides disabled accessible floating docks at many of the lakes we manage?**

Watershed Management:

Page 6, Land Treatment. The plan currently calls for 75% of the land to be treated. This is a little vague. Sediment-yield studies show that most of the sediment yield on projects like this is traceable to a small fraction of the watershed (usually gullies). Measures should be taken to identify and treat specific serious erosion problems in the watershed if the lake is to provide quality recreational use for several years.

Page 44, Land Use Treatment. A goal for total CRP acres in the watershed should be established to assist in reaching project objectives.

Page 16, Erosion and Sedimentation. Erosion has been identified as a chronic problem, therefore, forested riparian buffers along streams and grass filter strips in crop fields within the watershed would avoid and minimize impacts to the aquatic community. Objectives for strategically located continuous CRP contracts would be appropriate to help accomplish this objective.

P. 18, Wetlands. Could additional wetlands be developed on private lands at key locations in the watershed to increase wetland acres and improve water quality? Small wetlands (i.e., catchment basins) to retain sediments at tile outlets and waterways would reduce stream sedimentation impacts.

Management/Use:

P. 37, Mitigation Features. The statement that no mowing will occur around the lake is extremely undesirable from a recreational perspective. Need to state that some mowing will be performed to provide recreational users a more preferred access.

P. 4, Project Purposes. The Little Otter Creek Reservoir project area is 743 acres in size (i.e., 362 permanently impounded acres, 62 seasonally wet acres, and 319 mitigation acres). Hunting and trapping should be recognized as legitimate recreational uses while realizing that opportunities may be somewhat limited. These activities may play an important role in managing populations of species that can reach nuisance levels such as beaver, muskrats, geese and deer.

Page 23, Effects of Alternative Plans. This section doesn't address forest resources?

Page 6, Wildlife Habitat. This section lacks specific details. What type of wildlife habitat improvements and developments? Is this straight-forward mitigation of lost habitats or improvements far and above habitats which will be lost?

Page 25, Recreation. The recreation section on page 25 focuses on fishing and does not mention hunting, trapping and other tradition uses.

The hiking trail and areas associated with the developments could be enhanced with diverse prairie plantings.

Page 26 Wildlife Habitat. Prairie reconstruction on suitable sites would provide high wildlife benefits and educational opportunities on a historically prairie landscape; emphasis should be placed on native habitats that include diverse prairie grasslands. Native plantings would be more wildlife-friendly and would result in reduced maintenance costs. MDC could assist with prairie plantings as well as other habitat improvements.

Page 7, Mitigation Features. Would small scale cereal grain food plots be acceptable on suitable sites to enhance wildlife habitat benefits? Such areas could provide small game hunting or trapping opportunities and could be a good strategy to control goose problems by providing browse areas in strategic locations.

Page 44, Land Use and Treatment. Land treatments are favorably worded to allow flexibility in techniques for habitat management, but are not consistent with the rest of the document.

Partnerships/Funding:

Page 4, Table A, Project Costs. The Caldwell County Commission will be looking to MDC to fund the recreational portion of the project. Although MDC would consider participating in development of a reservoir access through the Community Assistance Program, the Department's administration has clearly stated there would be no contributions toward construction or maintenance of the reservoir.

Facilities:

Page 53, Table 2B. What is the justification for a one mile trail?

Page 25, Recreation. A covered, floating fishing dock should be added/substituted for the fishing pier. Because the prevailing winds are SW/NW, a location on the west side of the lake is preferable to the current planned location for these facilities on the east side of the lake. If there is an expectation of MDC being one of the local sponsors (through CAP) for recreational facilities, our agencies need to do some major adjustment of the recreational facilities in terms of what, where, when, how, and at what cost. This will require a meeting of MDC, NRCS, and local sponsors very soon to discuss these issues. MDC could fund the fishing dock, privies, boat ramp, shelter house, road, and stock and manage fish populations under the CAP agreement.

Page 53, Table 2B. These cost figures look pretty good. However, a shelter house should be budgeted in the amount of \$25,000 and a floating fishing dock and/or the fishing dike should be budgeted in the amount of \$25,000 each.

Page 35, Recreational Facilities. Public access seems limited. Couldn't vehicle access be obtained on the east and west sides midway up the lake at the ends of the county road that would be inundated (south end of sections 28 and 29)? Also, the road dividing sections 28 and 29 on the northern portion would provide good access to the upper reaches of the east and west arms of the lake.

Mitigation:

Page 27, Stream Resources, Existing Conditions. This section begins "Little Otter Creek is a very good quality north Missouri stream. The gravel/cobble substrate present in Little Otter Creek is unique in north Missouri streams." Careful thought will be required for consideration of impacts to the impacted reaches of Little Otter Creek through mitigation. The MDC would like to be involved with development of mitigation concepts prior to the Section 404 permit procedures in order to save time and reach consensus. Would the NRCS be open to this approach?

Page 13, Table C. Of the total 862 acres of forest lands within the watershed, 320 acres are floodplain forest. Page 18 states that "most of the timbered areas occur along the streams and drainage channels." On page 37 (Mitigation Features), you state that wildlife habitat loss will be mitigated through tree planting on the 319-acre mitigation area adjacent to the reservoir. Mitigation of bottomland forest should be in the form of planting bottomland hardwood trees in the bottomlands. Tree replacement plantings along the lakeshore are not ecologically similar to bottomland forest communities.

Page 2, Land Use/Land Cover. There is no mention of wetland "cover" in the watershed in this table, but on page 14, 18, and 26 (i.e., Wetlands section) mention is made of 47 acres of NWI wetlands. While it is not necessary to make neither delineations nor jurisdictional determinations of potential wetland areas during the DEIS phase of this project, a table of potential wetland types (following Cowardin *et al.* 1979) and sizes would be beneficial. Such information might lend credence to the statements on page 6 and 26 (Wetlands) that "there will be no net loss of wetlands as a result of project activities." Some discussion would seem appropriate on the type(s) of wetland habitat that will be created on the 109 acres of shallow portions of the reservoir and the 62 acres of "temporary wetland habitat" within the temporary pool so that meaningful evaluations of no net loss can be understood.

Page 7 and 37, Mitigation Features. Mowing should not be prohibited, but limited or restricted to meet habitat management objectives. Could be included in the sentence with prescribed burning in the same paragraph.

End of comments



Natural Resources Conservation Service
Parkade Center, Suite 250, 601 Business Loop 70 West
Columbia, Missouri 65203

February 10, 2003

Daniel J. Witter, Ph.D.
Policy Coordination Chief
Missouri Department of Conservation
P.O. Box 180
Jefferson City, Missouri 65102-0180

Dear Mr. Witter:

This letter responds to your comments on the Draft Little Otter Creek Watershed Plan-EIS.

General Comments

As described in the Investigations and Analyses Section of the DEIS, the tri-agency team composed of biologists from USFWS, NRCS, as well as MDC, agreed to use WHAG that was developed by MDC. The WHAG software allowed us to assess the various habitat types to be impacted for 14 different species with niche requirements that represented all of these habitat types. Based on the field data collected, the tri-agency team agreed that the bobwhite quail habitat suitability index (HSI) would be used to assess the loss of the upland habitats to be impacted. The use of the quail HSI provided the greatest number of mitigation acres. These mitigation acres will not be developed solely for bobwhite quail, but rather will adequately compensate for the various habitats impacted and emphasize the species that require these habitat types. NRCS, along with MDC, USFWS, and other appropriate federal and state personnel will develop mitigation plans for the mitigation acres. The planning document has been edited and supplemented to include and clarify the above information.

Property to be acquired by the Sponsors is projected to include land from the permanent pool elevation to the elevation of the crest of the auxiliary spillway. NRCS will also recommend that the Sponsors give consideration to acquiring additional landrights to cover an area to the top of dam elevation. These additional real property rights would provide an extra 72 acres of vegetative buffer. These land areas are shown on the "Site and Recreational Facilities Map", Appendix B.

Specific Comments and Questions

Page 5 – Other Project Benefits – Fishing was the only recreational opportunity evaluated to generate project benefits and the document will be edited for clarification. We concur that other recreational opportunities will be created.

Page 27 – Alternative 1 – Comment noted and such meetings have been started.

Page 36 – Pre-Design Conference – Comment noted. Narrative will be changed to read, "The conference will be scheduled by the NRCS project engineer and attended by the NRCS district conservationist and other necessary NRCS personnel, MDC, USFWS, and other appropriate state and federal personnel, and representatives of Caldwell County".

Page 37 – Mitigation Features (flow augmentation) - Prior to obtaining the necessary project permits and the start of construction activities, NRCS will conduct meetings with relevant state and federal personnel, as well as the project Sponsors, to develop a flow augmentation plan. Flow augmentation, to the extent practicable, will replicate natural baseflow conditions and will be a component of measures needed to mitigate the impacts to Little Otter Creek between the reservoir outlet and the confluence with Otter Creek. Following installation of the project, it will be the responsibility of the Sponsors to operate and maintain the reservoir, including flow augmentation.

Page 49 – Table 2 – Cost estimates are based on past bids for similar projects. These are planning estimates provided by NRCS planning staff personnel and we consider them reasonable for this document.

Page 53 – Table 2B – Nature Trail, Fishing Dike – NRCS will provide up to 50% cost share for recreational facilities. It will be the Sponsors responsibility to obtain matching funds from whatever sources may be available. The term “fishing dike” should be viewed generically – a fishing platform, fishing dock, etc. could be substituted.

Watershed Management

Page 6 – Land Treatment – We do not agree with the sediment yield studies as stated. Sediment loss in the Little Otter Creek Watershed is not traceable to “a small fraction of the watershed”. Sheet-and-rill erosion occurs on all upland land uses and land covers throughout the watershed. Soil loss from sheet-and-rill erosion is approximately 3 times that of classic gully erosion and accounts for 50% of the total. About two-thirds of total soil loss is from sheet-and-rill and ephemeral gullies. Granted, delivery ratios for classic gullies are higher, but total yield to the concentrated flow systems and the watershed outlet from sheet-and-rill erosion is higher due to a significantly higher gross loss. Sheet-and-rill erosion will be adequately protected within the reservoir drainage area and all erosion sources will continue to be addressed through ongoing and future conservation programs.

Page 44 – Land Use Treatment – NRCS and the project Sponsors will encourage continued and expanded use of the Conservation Reserve Program but specific goals can not be set due to the volunteer nature of the program and uncertainty of future funding.

Page 16 – Erosion & Sedimentation – Erosion is chronic in the sense that it is always present either in the form of natural, geologic erosion or accelerated erosion. Erosion within the Little Otter Creek Watershed, while chronic, is occurring at relatively low rates for north Missouri – soil losses from all sources are approximately 4.5 tons per acre per year. Despite these low erosion rates, project activities call for further reductions through the implementation of additional conservation practices and extensive mitigation areas adjacent to the proposed reservoir. The reservoir will provide grade stabilization benefits, significantly reduce streambank erosion, and reduce substantially the amount of sediment delivered to downstream areas.

Page 18 – Wetlands - Other programs and practices, such as WRP, are available to landowners within the watershed. In addition, we will be investigating detention basins above and below the reservoir, as well as, creating shallow water areas in the upper ends and other areas of the pool.

Management/Use

Page 37 – Mitigation Features – The statement will be changed to “Mowing will be allowed where necessary to enhance recreational opportunities or as a method to enhance wildlife habitat when approved by appropriate MDC and USFWS personnel”.

Page 4 – Project Purposes - Hunting and trapping may be available if the Sponsors determine that they are allowed. If so, MDC and USFWS will be consulted for guidance.

Page 23 – Effects of Alternative Plans – Forest Resources have been added.

Page 6 – Wildlife Habitat – This is the “Summary” section of the plan. More specific details are included in the “Formulation and Comparison of Alternatives” and “Recommended Plan” sections. We will add the following narrative here, “NRCS will develop a mitigation plan in coordination with MDC, USFWS, other appropriate state and federal personnel, and the project Sponsors. The mitigation areas will adequately compensate for the various habitats impacted and emphasize the native species that require these habitat types”.

Page 25 – Recreation – Refer to the response to “Page 4 – Project Purposes” above.

Page 26 – Wildlife Habitat, Page 7 – Mitigation Features – These issues can be addressed during development of the mitigation plans. Refer to response to “Page 6 – Wildlife Habitat” above.

Page 44 – Land Use and Treatment – We are not aware of any inconsistencies. Without knowing what inconsistencies are being referred to, we have no response to this comment.

Partnerships/Funding

Page 4, Table A, Project Costs – Comment noted. Refer to the “Recommended Plan – Installation and Financing” section of the document.

Facilities

Page 53, Table 2B – A 1-mile trail was suggested by the Little Otter Creek Steering Committee and was used for planning purposes. Actual length of the trail is flexible.

Page 25, Recreation – The nature and location of recreational facilities to be installed is flexible. A fishing dock could be substituted for the fishing pier. The location was chosen primarily for two reasons. It was one of the few sites along the proposed shoreline that had mature trees and it has a fairly steep slope. It was our understanding that MDC prefers to have a 15% slope for boat ramps and this was one of the few locations on the proposed lake with such a slope. The steep slope also provides shoreline anglers access to deep water. NRCS and the project Sponsors are receptive to discussions about relocation of the recreational facilities and additional access to the lake.

Page 53, Table 2B – Comments noted.

Page 35, Recreational Facilities – Refer to response to “Page 25, Recreation” above.

Mitigation

Page 27, Stream Resources, Existing Conditions – NRCS agrees that careful thought will be required for consideration of impacts to Little Otter Creek. NRCS will include MDC, USFWS, other appropriate state and federal personnel, and the project Sponsors in development of mitigation plans prior to obtaining necessary permits and prior to start of construction activities.

Page 13, Table C – These issues will be resolved during development of the mitigation plan. NRCS will develop a mitigation plan in coordination with MDC, USFWS, other appropriate state and federal personnel, and the project Sponsors. Mitigation areas will adequately compensate for the various habitats impacted and emphasize the native species that require these habitat types.

Page 2, Land Use/Land Cover – Wetlands are not inventoried by standard land cover classifications. An additional map "Wetlands Identified by Farm Bill Wetland Inventory" has been added to Appendix D. Table G (Wetlands Identified Within the Top of Dam Elevation) has been added to the "Formulation and Comparison of Alternatives – Wetlands" section of the plan. Narrative concerning wetlands has been edited and supplemented for better clarification.

Page 7 and 37, Mitigation Features – Narratives have been changed to "Mowing will be allowed where necessary to enhance recreational opportunities or as a method to enhance wildlife habitat when approved by appropriate MDC and USFWS personnel".

Thank you for your review and comments of the draft Plan-EIS. Your office will receive a copy of the final plan when it is completed. If there are further questions or comments, please contact Harold Deckerd, Assistant State Conservationist at (573) 876-0912.


ROGER A. HANSEN ACTING
State Conservationist

cc: ✓ Harold Deckerd, ASTC, NRCS, Columbia, MO
Rob Cheshier, Geologist, NRCS, Columbia, MO



SEP 9 2002

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Denver Federal Center, Building 56, Room 1003
P.O. Box 25007 (D-108)
Denver, Colorado 80225-0007

ER 02/603

September 5, 2002

Mr. Roger A. Hansen, State Conservationist
USDA-Natural Resources Conservation Service
Parkade Center, Suite 250
601 Business Loop 70 West
Columbia, Missouri 65203

Dear Mr. Hansen:

The Department of the Interior (Department) has reviewed the Natural Resources Conservation Service's (NRCS) May 2002 Draft Environmental Impact Statement (DEIS) for the Little Otter Creek Watershed Plan, Caldwell County, Missouri, prepared under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566).

GENERAL COMMENTS

Based on the information provided in the DEIS, it is difficult to ascertain the primary purpose of this project. Three purposes are stated: 1) improve water supplies in Caldwell County 2), reduce flood damage, and 3) improve "water-based" recreation within 25 miles of the project area (DEIS Summary, page 3). Throughout the document, the priority of the purposes are inter-changed to emphasize the section of the DEIS being discussed. As a result, the reviewer is unable to discern whether the three purposes should be weighted equally or whether one purpose takes precedence over another. With reference to Table D on page 19, it appears that the local concerns are more heavily weighted on a more dependable public drinking water source, followed by the lack of "water-based" recreation, and thirdly by the need to reduce flood damage in the local area. It would be helpful if the EIS maintained a consistent view of the overall purpose(s) of the project.

The DEIS provides detailed analysis for only two alternatives: Alternative 1 (the Recommended Plan) and Alternative 2 (No Action). The DEIS devotes less than half a page (page 21) to a summary of other measures considered but not developed into viable alternatives. These measures are not presented in enough detail for the reviewer to gauge the thoroughness with which the measures were considered. For instance, the DEIS states that alternative sites for the reservoir were evaluated but none was large enough to provide sufficient storage to meet future projected needs of rural Caldwell County and its municipalities. However, no information is provided concerning the locations of these alternative sites or the approximate storage capacity of each site. There is also no discussion of whether two or more smaller reservoirs could be used in

combination to meet the primary project purpose(s). In reviewing the Louisville Corps of Engineers' EIS for the Proposed Water Supply Reservoir for Marion, Illinois, the 7th U.S. Circuit Court of Appeals found the document was inadequate for failing to consider combinations of smaller reservoirs as reasonable alternatives to one large reservoir.

The DEIS also fails to indicate whether municipalities sought other sources of funding to upgrade and/or enhance existing systems, including water line construction and improved water treatment facilities. The Environmental Protection Agency and Missouri Department of Natural Resources have existing programs to fund such projects. The EIS should address this as an alternative or at least provide some discussion of the practicability and possible costs of improving or expanding existing systems through these or other similar programs.

The Recommended Plan to build one multi-purpose reservoir will result in the inundation of 3.72 miles of Little Otter Creek and its tributaries, which the DEIS describes as "high quality" and "a relatively rare type of stream" for this region of Missouri. In light of this fact, all reasonable alternatives to the Recommended Plan should be fully evaluated. In accordance with the Council on Environmental Quality's (CEQ) regulations for implementing the National Environmental Policy Act (NEPA), the failure to consider alternatives that seem reasonable affects the credibility of an otherwise adequate NEPA review. Generally, the range of reasonable alternatives is broader and the number of alternatives whose impacts are appropriately analyzed is greater in an EIS. Reasonable alternatives include those that are practical or feasible from a common sense, technical, and economic standpoint and the number of reasonable alternatives considered in detail should represent the full spectrum to meet the stated purpose and need (46 FR 18026, March 23, 1981, as amended, 51 FR 15618, April 25, 1986). Further, Section 102 (2)(E) of NEPA states that each preparer of an EIS should study, develop, and *describe* (emphasis added) appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources. While some alternatives may be outside the realm of the U.S. Department of Agriculture's jurisdiction, the CEQ regulations (Section 40 CFR 1502.14) require that an EIS examine all reasonable alternatives to the proposal and not just those which the applicant is capable of carrying out.

A primary objective of NEPA is to ensure that agency decisionmakers take environmental factors into account. This objective is to be accomplished by presenting in the EIS the environmental impacts of a proposed action and reasonable alternatives in comparative form so that a clear basis for choice among options is provided to agency decisionmakers and the public. Each alternative is to be given substantial treatment and to be objectively evaluated. Due to the cursory treatment in the DEIS of the other possible measures to meet one or more of the project purposes, the reviewer is unable to determine if there are reasonable alternatives to the Recommended Plan, and if so, whether the alternative(s) would be environmentally preferable to the Recommended Plan. Accordingly, we recommend that NRCS prepare and distribute for review a revised DEIS to provide that information.

ENDANGERED SPECIES ACT COMMENTS

Indiana bat

Conflicting information is given in the DEIS regarding endangered species issues. On page 2, NRCS correctly indicates that the federally listed Indiana bat may occur in the project area. However, on page 6 NRCS concludes there are no endangered species in the project area. The information on page 6 should be corrected to be consistent with page 2.

The U.S. Fish and Wildlife Service (USFWS) agrees with the conclusion that only one federally listed species, the endangered Indiana bat (*Myotis sodalis*), may occur in the project area. However, the DEIS should disclose how NRCS intends to avoid adverse impacts to this species, rather than simply state that the species will not be adversely affected. The USFWS has recently worked very closely with NRCS to establish procedures to avoid adverse impacts to this species. Reviewers of the EIS should be made aware that these procedures are in place, either by providing the information in an appendix or in the endangered species section of the EIS.

From late fall through winter, Indiana bats in Missouri hibernate in caves in the Ozarks and Ozark Border Natural Divisions. During the spring and summer, Indiana bats utilize living, injured (e.g., split trunks and broken limbs from lightening strikes or wind), or dead or dying trees for roosting throughout the state. Indiana bat roost trees tend to be greater than 9 inches in diameter at breast height (dbh) (optimally greater than 20 inches dbh) with loose or exfoliating bark. Most important are structural characteristics that provide adequate space for bats to roost.

Preferred roost sites are located in forest openings, at the forest edge, or where the overstory canopy allows some sunlight exposure to the roost tree, which is usually within 1 km (0.6 mi.) of water. Indiana bats forage for flying insects (particularly moths) in and around the tree canopy of floodplain, riparian, and upland forests.

If trees suitable for use by Indiana bats are to be removed for the proposed project, they must be removed between October 1st and March 30th to avoid the potential injury or death to roosting individuals and maternity colonies. If it is not feasible to schedule tree removal during this period, the USFWS requires a survey, to determine the presence or absence of Indiana bats, be conducted by a qualified biologist. Survey efforts should include using a combination of mist nets and bat detection devices [e.g., "Anabat" (© Titley Electronics, Ballina, New South Wales, Australia)]. If it is determined that a survey for Indiana bats is needed, please contact the USFWS's Missouri Ecological Services Field Office to obtain specific information regarding survey protocol. If surveys indicate that Indiana bats are using trees proposed to be removed during their breeding season (April 1 to September 30), further consultation with the USFWS under section 7 of the Endangered Species Act will be required.

Topeka shiner

The Topeka shiner is a minnow of small, clear, low-order prairie streams. The dominant substrate type of these streams is most often clean gravel, cobble or sand, although stream bottoms of bedrock or clay hardpan are not uncommon. These streams may cease to flow during dry seasons, but permanent pools are maintained by percolation of water through the stream bed, spring flow, or groundwater seepage. Topeka shiners most often occur in pool or run areas of streams, seldom being found in riffles.

Historically, the federally listed endangered Topeka shiner (*Notropis topeka*) occurred in reaches of Shoal Creek. Little Otter Creek flows into Shoal Creek up stream from the location of this historic record. The DEIS included an Aquatic GAP evaluation which confirmed that the Topeka shiner does occur in the Plains-Grand-Chariton Ecological Drainage Unit (EDU), which includes Little Otter Creek.

Initial site investigations of Little Otter Creek indicated that it may be suitable for Topeka shiner. As a result, the Missouri Department of Conservation conducted a survey of the fish community to determine the presence of Topeka shiner. Three surveys were conducted: 1) at the proposed dam construction site, 2) within the middle reach of the proposed reservoir, and 3) at the upper reach of the proposed pool. No Topeka shiners were collected. Therefore, the Topeka shiner will not be affected by the proposed project. However, future reestablishment of the Topeka shiner into parts of its historic range could be limited by the construction of this project.

The USFWS requests that the above information be included in the EIS to fully address the federally listed species which could occur in the project area.

FISH AND WILDLIFE COMMENTS

The USFWS is concerned about the primary and secondary impacts to Little Otter Creek that would result from implementation of the Recommended Plan. The DEIS indicates that Little Otter Creek is within the Plains-Grand-Chariton EDU (a classification unit of a system which seeks to identify distinct riverine ecosystems according to natural physical and biological characteristics). This EDU comprises a large area of north central Missouri. Results from the Aquatic GAP analysis indicate that Little Otter Creek is classified as Headwaters or Creek and that only 2 percent of the streams in this particular EDU exhibit the high quality characteristics of Little Otter Creek, making it relatively rare in this part of Missouri. Currently, Little Otter Creek is not on Missouri's 303 (d) list of the Clean Water Act, which indicates that there are no major water quality concerns. The DEIS describes the channel and surrounding riparian habitat as a stream which is predominantly intact with only a 1.4 mile reach exhibiting moderate to severe stream erosion. It would appear that of the total 3.7 miles proposed to be inundated, just over 1/3 of the stream reach is exhibiting major erosional problems. Instead of using a 362-acre reservoir to address the erosional problems within the Little Otter Creek watershed, the USFWS recommends a multi-faceted, non-structural approach utilizing new conservation programs

identified in the new Farm Security and Rural Investment Act of 2002, the Missouri Conservation Reserve Enhancement Program, and other state and federal conservation programs to stabilize soils in the upper reaches of the watershed.

No fish and wildlife mitigation plan has been prepared to address the loss of the 3.7 miles of Little Otter Creek that would result from implementation of the proposed action. The DEIS indicates that NRCS intends to develop details for mitigating the impacts to Little Otter Creek in association with its application for a Clean Water Act Section 404 permit and state 401 Clean Water Certification. Section 1502.16(h) of CEQ's regulations indicates that the environmental consequences section of an EIS shall include discussions of means to mitigate adverse impacts if not already fully covered under the description of the proposed action or alternatives per section 1502.14(f). We recommend that a revised DEIS include discussion of mitigation of the adverse impacts of the proposed action and all reasonable alternatives to that action. The USFWS, the U.S. Army Corps of Engineers, the Missouri Department of Conservation (MDC), and the Missouri Department of Natural Resources should be consulted during development of the mitigation plan(s).

The dependence on a single reservoir as the sole water source will increase the frequency and magnitude of pool level draw downs (especially during drought periods), which could adversely impact the fish and wildlife values of both the reservoir and the reach of Little Otter Creek downstream of the reservoir. There appears to be conflicting information in the DEIS regarding stream flows should the preferred alternative be built. In several places (e.g., pages 6, 7, 27, and 37), the DEIS indicates that releases from the reservoir will replicate, as nearly as possible, a natural flow regime and that the flow recommendation will be developed through consultation between MDC and NRCS personnel and the Sponsors. On page E-3, it is indicated that a discharge of 60 gallons per minute is included in the reservoir design. This issue needs to be more clearly addressed in a revised DEIS. We consider the augmentation of downstream flows a critical environmental and mitigation issue and request that the USFWS be consulted in the development of the augmentation measures.

The DEIS identifies 38 acres of natural forested wetland which will be impacted by this project and at least 9 acres of isolated emergent wetlands. While we agree that there will be no net loss of wetland acreage with the construction of the preferred alternative, based on the information provided in the DEIS, the mitigation wetlands or those created by the reservoir may not be of the same type of wetland habitat or habitat with the same hydrology. If impacts to wetlands cannot be avoided or minimized, forested wetlands of the type described in the DEIS should be mitigated at a ratio of no less than 2.5:1. Therefore, we believe at least 104 acres of wetlands should be provided as mitigation, 95 acres of which should be seasonally flooded forested wetlands.

We support proposed efforts to buffer any reservoir with nearly the same number of acres as the reservoir pool for the purpose of providing fish and wildlife habitat. However, we did not find specific plans in the DEIS for how these acres will be managed over time for fish and wildlife

habitat. Nor was there is any indication that the Sponsors have planned for fish and wildlife management costs in the long term maintenance plans.

Throughout the document there are references concerning fish and wildlife habitat where NRCS will consult solely with MDC for guidance or input. While we recognize MDC as a very important component to fish and wildlife resource decisions in Missouri, there are also issues on a federal level which NRCS must consider. The CEQ NEPA regulations identify the USFWS as the federal agency with special expertise on fish and wildlife matters (49 Fed. Reg. 49750, December 21, 1984). Therefore, when considering fish and wildlife aspects of the proposed project, we request that you properly consult with the USFWS. This would include flow regimes, mitigation planning for fish and wildlife habitat, fish and wildlife habitat enhancement and restoration, and other similar issues. The need to consult with the USFWS should be inserted at each instance in the DEIS that mentions consulting with MDC.

SUMMARY COMMENTS

The Department recommends that NRCS prepare and distribute for review a revised DEIS to provide: 1) additional detail concerning the other possible measures that NRCS initially considered to meet one or more of the project purposes, 2) analysis of reasonable alternatives to the Recommended Plan, and 3) discussion of mitigation of the adverse impacts of the proposed action (including mitigation to address the loss of the 3.7 miles of Little Otter Creek) and all reasonable alternatives to that action.

The Department, through the USFWS, has a continuing interest in working with NRCS to ensure that impacts to fish and wildlife are adequately addressed. For continued coordination and consultation with the USFWS, please contact the Field Supervisor, U.S. Fish and Wildlife Service, 608 E. Cherry St., Room 200, Columbia, Missouri 65201, telephone 573-876-1911.

We appreciate the opportunity to provide these comments.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert F. Stewart", with a stylized flourish at the end.

Robert F. Stewart
Regional Environmental Officer



Natural Resources Conservation Service
Parkade Center, Suite 250, 601 Business Loop 70 West
Columbia, Missouri 65203

February 5, 2003

Robert F. Stewart, Regional Environmental Officer
U.S. Department of the Interior, Office of the Secretary
Office of Environmental Policy and Compliance
P.O. Box 25007 (D-108)
Denver, Colorado 80225-0007

Dear Mr. Stewart:

This letter responds to your comments on the Draft Little Otter Creek Watershed Plan-EIS.

General Comments

The Little Otter Creek Watershed Project will serve multiple purposes and satisfy a range of locally identified needs. An adequate, dependable, locally-controlled, rural water supply, increased recreational opportunities and enhanced fish and wildlife habitats, and flood prevention have all been identified by the residents of Caldwell County as natural resource concerns. All are considered priorities. Certainly, the fact that the availability of a reliable supply of potable water is extremely limited and therefore affects the entire county, makes it a primary concern. However, this does not diminish the need to address other concerns raised by the residents of Caldwell County.

Certain portions of the Plan-EIS have been supplemented with additional narratives. A new section entitled "Alternatives Considered but Eliminated from Detailed Study" has been added to the Formulation and Comparison of Alternatives portion of the Plan-EIS. The section entitled "Agricultural Water Management (Rural Water Supply)" in this same portion has also been expanded. Also, the section entitled "Agricultural Water Management (Rural Water Supply)" in the Watershed Problems and Opportunities portion has been supplemented. These sections now contain additional narratives and information from Allstate Consultants; Allgeier, Martin, and Associates; the Green Hills Regional Planning Commission; and the Missouri Division of Geological Survey and Water Resources.

This information details current water usage, projected usage, problems associated with obtaining water from other sources, consideration and dismissal of other sites in the watershed, and provides support for the elimination of other alternatives from detailed consideration. As an example, to pipe 1.2 million gallons of water per day from Smitheville Lake would cost \$10,000,000 according to preliminary figures prepared by Allstate Consultants. This is not an economically defensible alternative considering that the recommended plan has a cost estimate of \$6,200,000. Also, the pipeline alternative would not address the other plan purposes, would environmentally impact an estimated 60 miles needed for installation, and would introduce great uncertainty as to the future availability and cost of such water. Consequently, the recommended plan which creates a locally-controlled, regional, surface water supply and also fulfills other project purposes, is the only reasonable alternative identified and supported by the local Sponsors and the voters of Caldwell County.

NRCS did not receive requests from municipalities within Caldwell County to upgrade and/or enhance existing water systems. While there are numerous, small systems throughout the county, many are inadequate, outdated, and costly to maintain. According to Allgeier, Martin, and Associates, Inc. (June 1992), availability of a reliable supply of potable water is extremely limited within the project area and although several public water systems exist, they lack the ability to expand sufficiently to alleviate the problem to any meaningful degree. Due to increased testing requirements, increased criteria for water quality, and increased treatment plant operator certification requirements scheduled to begin in 2004, the MDNR Public Drinking Water Section has serious doubts if these systems will be able to meet the requirements.

The request for assistance received by NRCS was from the Caldwell County Commission. The commission's desire is to see the establishment of a regional water supply system that is adequate, dependable, and locally-controlled. Caldwell County municipalities would be able to connect to such a regional system and eventually abandon outdated, inadequate facilities. Also, Caldwell County residents who now rely on cisterns, shallow wells, and hauled water would have access to a dependable source of good quality water.

Endangered Species Act Comments

Indiana bat – Language in the Little Otter Creek Watershed Plan–EIS will be changed to be consistent throughout the document regarding the Indiana bat. Narrative will read as follows: “The Indiana bat (*Myotis sodalis*) may occur in the watershed. In order to avoid adverse impacts to the Indiana bat, the guidelines developed by the U.S. Fish and Wildlife Service for the conservation of the Indiana bat will be followed as per NRCS Biology Technical Note No. 17”.

Topeka shiner – The following narrative will be added to the “Formulation and Comparison of Alternatives – Threatened and Endangered Species” section of the plan.

“The Topeka shiner is a minnow of small, clear, low-order prairie streams. Historically, the federally listed endangered Topeka shiner (*Notropis topeka*) occurred in reaches of Shoal Creek. Little Otter Creek flows into Shoal Creek upstream from the location of this historic record. The Aquatic GAP evaluation confirmed that the Topeka shiner does occur in the Plains-Grand-Chariton Ecological drainage unit (EDU), which includes Little Otter Creek.

Initial site investigations of Little Otter Creek indicted that it may be suitable for Topeka shiner. As a result, the Missouri Department of Conservation conducted a survey of the fish community to determine the presence of the Topeka shiner. Samples were collected at three locations: 1.) at the proposed structure site, 2.) within the middle reach of the proposed reservoir, and 3.) at the upper reach of the proposed pool. No Topeka shiners were collected. Therefore, the Topeka shiner will not be affected by the proposed project.”

Fish and Wildlife Comments

NRCS is not “using a 362-acre reservoir to address the erosional problems within the Little Otter Creek watershed”. The reservoir project will address the plan purposes as identified by the residents

of Caldwell County and the project Sponsors. As mentioned above, these are to provide an adequate, dependable, locally-controlled, rural water supply, increased recreational opportunities and enhanced fish and wildlife habitats, and flood prevention. Grade stabilization and reduction of streambank erosion are additional, fringe benefits associated with installation of the reservoir. Programs to "stabilize soils in the upper reaches of the watershed" are detailed in the "Recommended Plan – Land Use and Treatment" section.

Prior to obtaining the necessary project permits and the start of construction, NRCS will consult with the appropriate state and federal personnel, as well as the project Sponsors, to develop a mitigation plan for the loss of stream habitat in Little Otter Creek. Discussions already conducted have determined that mitigation measures for the 3.7 miles of stream that will be lost due to inundation could include, but are not limited to, long term easements on riparian areas in the Little Otter Creek watershed and/or cash payment to the Stream Stewardship Fund.

There will be an altered flow regime in approximately 3.8 miles of Little Otter Creek between the reservoir outlet and the confluence with Otter Creek. NRCS does not feel there is "conflicting information" concerning post-project releases from the reservoir. Such releases have not been determined yet. Along with stream flow augmentation, numerous mitigation issues will be resolved prior to obtaining the necessary permits and the start of construction activities. Interagency coordination among biologists, hydrologists, engineers, and others will serve to minimize any negative impacts to stream habitats. Every effort will be made to develop environmentally-sensitive and engineeringly feasible designs for reservoir releases. It should be made clear that the 60 GPM flow referred to in the plan is a planning estimate (based on regional data provided by USGS) and does not necessarily reflect on the actual storage that will be included in the final reservoir design.

The wetland acres identified in the plan that will be impacted by the project are preliminary at this time and are based on the best available data using offsite methods. Prior to reservoir construction, a certified wetland determination will be conducted onsite within the project area and these data will be used to obtain the necessary federal and state permits which will include mitigation for any wetland impacts.

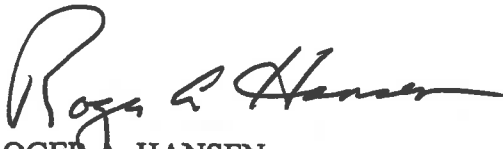
Mitigation features are addressed in the "Recommended Plan" section of the document. Planting and management of grasses, timber, and other vegetation; fencing and livestock exclusion; prescribed burning; haying; grazing and mowing; etc. are addressed in general terms. "Specific plans" are not discussed in the planning document since the exact nature and extent of lands to be acquired is not known. Such specifics will be addressed and the necessary agreements regarding OM&R and management of lands will be entered into prior to acquisition of such lands and the start of construction activities.

Certain narratives in the document have been edited to include USFWS in consultations and decisions concerning fish and wildlife habitat, mitigation, and other relevant issues. In some cases USFWS is named directly and in other cases the generic term "appropriate federal and state personnel" is used.

Certain sections of the Little Otter Creek Watershed Plan-EIS have been rewritten or edited to provide better clarification. Supplemental narratives and references have also been added to support

the information, conclusions, and recommendations put forth in the planning document. According to CEQ regulations 40 C.F.R. Part 1502.9, a revised DEIS shall be prepared "If a draft statement is so inadequate as to preclude meaningful analysis". NRCS does not believe this is the case. EPA has rated the DEIS for this project "LO", which means Lack of Objections and "has not identified any potential environmental impacts requiring substantive changes to the proposal". No other agencies that reviewed the DEIS have recommended that a revised DEIS be prepared. NRCS will move forward with the preparation of the Final EIS.

Thank you for your review and comments of the draft Plan-EIS. Your office will receive a copy of the final plan when it is completed. If there are further questions or comments, please contact Harold Deckerd, Assistant State Conservationist at (573) 876-0912.

A handwritten signature in black ink, appearing to read "Roger A. Hansen". The signature is fluid and cursive, with a large initial "R" and "H".

ROGER A. HANSEN
State Conservationist

cc: Harold Deckerd, ASTC, NRCS, Columbia, MO
Rob Cheshier, Geologist, NRCS, Columbia, MO

STATE OF MISSOURI Bob Holden, Governor • Stephen M. Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.state.mo.us

September 4, 2002

Mr. Roger A. Hansen
State Conservationist
Natural Resources Conservation Service
Parkade Center, Suite 250
601 Business Loop 70 West
Columbia, MO 65203

RE: Draft Environmental Impact Statement, Little Otter Creek Watershed

Dear Mr. Hansen:

The Water Pollution Control Program has reviewed the draft of the Environmental Impact Statement (EIS) for the Little Otter Creek Watershed Plan and offers the following comments:

The purpose of the structure is three-fold. First, to provide a dependable water supply to the rural areas of Caldwell county; second, reduce flood damages; and third, to provide recreational opportunities. This project may detain water; however, that water is not supplied to the rural areas. Each rural area would incur costs to install and construct a water delivery system. Additional storage in current water supply structures could be obtained by increasing the height of existing dams closer to the city of Hamilton. We would encourage consideration of less costly flood control alternatives such as berms, overflow channels, off-line retention/detention ponds to minimize the destruction of this high quality stream with extensive wetlands before this project proceeds.

General:

1. Since this lake is intended to be a public drinking water supply, as well as a recreational area, care should be taken to prevent nonpoint source pollution. Native (preferably woody or warm-season) vegetation that will require little long-term maintenance/mowing should be planted along the shoreline and right-of-ways. By reducing or ceasing to mow these areas, the amount of water intercepted and retained by vegetation will increase, reducing erosion and peak flows. Vegetation also provides filters and can absorb some roadside contaminants. This would be in keeping with Executive Order 13112, which directs agencies to prevent the introduction of invasive species. Using native vegetation will benefit aquatic organisms that have terrestrial life stages and have evolved floristic environmental cues. Unmowed vegetation may also prevent nesting sites for non-migratory geese. Other lakes in the area, including Smithville and Watkins Mill, have had beach closings due to excessive fecal coliform counts as a result of waterfowl populations.

Integrity and excellence in all we do

2. Efforts should be made to landscape right-of-ways with native plant material that will require little long-term maintenance/mowing. By reducing or ceasing to mow these areas, the amount of water intercepted and retained by vegetation will increase, reducing erosion and peak flows. Vegetation also provides filters and can absorb some roadside contaminants. Using native vegetation will benefit aquatic organisms that have terrestrial life stages and have evolved floristic environmental cues.
3. A watershed management plan should be developed. Early landowner involvement is important as classification to a drinking water supply can potentially add requirements on how land in the watershed is managed. Appropriate buffers should be established above the anticipated high water level to control potential development, but most importantly to protect water quality from excessive nutrients and pesticides or other potential releases associated with land use. The Missouri Department of Health and Senior Services rules governing on-site sewage disposal requires minimum setback distances from the disposal area of 100 feet to a private water supply well and 300 feet to a public water supply well. The label setback requirement for Atrazine application is 200 feet from any natural or impounded lake or reservoir. Land application of animal waste is 300 feet from a water supply structure or impoundment. A minimum buffer distance of 100 feet should be designed around the lake.
4. Old structures in the drainage area and trash in adjacent ditches should be surveyed to determine if toxic material would be flooded as a result of the dam construction. A Phase 1 environmental assessment would determine if any existing abandoned toxic waste sites were in the watershed. This department's Hazardous Waste Program or the Solid Waste Management Program may have information on possible active or abandoned sites. All waste that will end up in the pool area must be removed and properly disposed of in a permitted landfill or taken to a permitted transfer station. All waste that is outside the pool may either be left in place, buried in an area where surface or groundwater will not be impacted, or taken to a landfill or transfer station (listed in order of least preferable to most preferable). We also recommend that all pesticide containers be removed and properly disposed of regardless of whether they are in the pool or watershed.
5. The proposed project crosses three roadways. The EIS did not address how crossings would be constructed. Bridges are preferable over culverts because they minimize impacts to aquatic resources. Bridges reduce the amount of stream channelization, are less likely to become clogged with debris, and allow for natural substrate and vegetation to remain in place. If used, culverts should be designed so that they do not change the low-flow characteristics of the streams.

Wetland Impacts:

As stated in the abstract, "there would be no net loss of wetlands as result of project activities." We note that 109 acres will be created in the shallow areas of the reservoir and 62 acres in the temporary pool. It is not clear if these will follow wetland delineation guidelines with wetland soil/vegetation and hydrology. Current wetlands include 38 acres of seasonally flooded forest, and 9 acres of

Mr. Roger A. Hansen
Page 3

emergent wetlands in pastures. The department would like to receive additional information on how these wetlands were determined and if possible a map prepared by a qualified COE wetland hydrologist showing the current wetlands. Wetlands already provide flood control and storage. Aquatic mitigation guidelines place a high value on flooded forest (wooded wetlands 3:1 ratio).

Stream Impacts

This project may violate state water quality standards 10 CSR 20-7.031(3)(G) in that approximately 1.8 miles of very good quality 4th order stream, with a good fish community and riparian corridor, will be lost. The stream also has a unique gravel/cobble substrate and bedrock controlled landscape that prevents downcutting. The EIS should include changes in temperature, dissolved oxygen, and fish diversity due to the installment of this structure.

Endangered Species

The project setting states that the Topeka Shiner and Stonecat Madtom occur in this Ecological Drainage Unit, but were not collected in the Little Otter Creek. The consultation process in the Endangered Species Act was followed for the Indiana bat; however, there is no mention of the Topeka Shiner and Stonecat Madtom. Although the department is not the lead agency for endangered species, we would encourage further evaluation of this issue and suggest the EIS include information on these species, their occurrence in the area, and the effect the proposed structure would have.

Thank you for the opportunity to comment. If you have any questions, please contact Georganne Bowman of the Water Pollution Control Program's Planning Section at (573) 526-1157 or by mail at the Missouri Department of Natural Resources, Water Pollution Control Program, P. O. Box 176, Jefferson City, MO 65102-0176.

Sincerely,

WATER POLLUTION CONTROL PROGRAM



Jim Hull
Director

JH:gbd

c: Scott B. Totten, Director, Water Protection and Soil Conservation Division
Don W. Boos, Planning Section, WPCP



Natural Resources Conservation Service
Parkade Center, Suite 250, 601 Business Loop 70 West
Columbia, Missouri 65203

February 5, 2003

Jim Hull, Director
Water Pollution Control Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, Missouri 65102-0176

Dear Mr. Hull:

This letter responds to your comments on the Draft Little Otter Creek Watershed Plan-EIS.

In order to deliver the rural water supply provided by proposed Reservoir LO-1, Caldwell County will need to construct a treatment plant and modify the current delivery system. These measures are outside the scope of the Little Otter Creek Watershed Plan-EIS.

We are not aware of any existing water supply structures "closer to the city of Hamilton" that could be increased in height to provide the 1.2 million gallons of water per day that will be available from Reservoir LO-1. Also, just adding height to an existing structure would not meet the required NRCS Class C criteria for water supply reservoir construction.

NRCS does not consider the construction of flood control alternatives "such as berms, overflow channels, off-line retention/detention ponds" to be a reasonable option. Construction of a reservoir of similar size as the proposed LO-1 would still be necessary to meet the project purposes of rural water supply and fish, wildlife, and recreational development. Providing for all project purposes in one reservoir will impact a smaller area and be more cost effective.

General Comments

Comments 1 & 2 – Non-point source pollution and erosion will be reduced in the watershed through ongoing and future conservation programs and by the requirement that soil losses be reduced to tolerable limits on 75 percent of the reservoir's drainage area. Vegetative buffer strips will be established around the reservoir that will serve to reduce erosion and act as a filter for sediment-laden waters and other pollutants.

NRCS will develop mitigation plans in consultation with MDC and the USFWS. Mitigation areas will adequately compensate for the various habitats impacted and emphasize the native species that require these habitat types. The appropriate state and federal personnel will be consulted concerning vegetative plantings. Native species will be used as much as possible and invasive species will be avoided. Most of the shoreline area will be managed for wildlife and will not be mowed. These areas will be allowed to revegetate with native species already in the watershed. Mowing will be allowed where necessary to enhance recreational opportunities or as a method to enhance wildlife habitat when approved by MDC and/or USFWS personnel. Sensitive areas will be seeded and/or planted with wildlife friendly, native, vegetation mixtures. This type of vegetation will also act as a filter, trap sediment, and reduce runoff.

Comment 3 – Landowner involvement has been a part of the planning process since 1993. A steering committee, consisting of local residents, was formed in 1993. Several public meetings were held during formulation of the plan to keep landowners and other county residents updated on project activities. Landowner involvement within Caldwell County is strongly evidenced by the August 6, 2002 voter approval of a 0.5 percent sales tax to assist in funding of the local match for project installation. A meeting was held on September 5, 2002 with the Caldwell County Commission, the Caldwell County Lake Project Steering Committee, and landowners that will be directly impacted by installation of Reservoir LO-1. The recommended plan was presented and questions concerning the project were addressed.

The Little Otter Creek Watershed Plan-EIS is a watershed management plan. The Caldwell County Commission is well aware of the need to protect the watershed above the reservoir. Caldwell County presently has zoning regulations and will review these to see if changes or additions need to be implemented. Prior to construction, 75 percent of the drainage area must be adequately protected from erosion. NRCS and the Sponsors will encourage continued and expanded use of the CRP and similar programs to protect the entire watershed.

Land treatment for water quality protection will be improved through existing NRCS, SWCD, MDNR, MDC, and EPA technical, financial, and educational programs. Sponsors will acquire landrights around the reservoir that will cover an area equal to that at the elevation of the crest of the auxiliary spillway. NRCS is encouraging the county to acquire additional landrights to the top of dam elevation that will provide additional buffer area adjacent to the reservoir. Due to the close proximity of U.S. Highway 36, the Caldwell County Commission will prepare an emergency action plan that will include actions to protect the water supply in the event of a transportation accident.

Comment 4 – Prior to construction, the area to be inundated will be surveyed to determine the presence of any solid or hazardous wastes. All waste that is found below the elevation of the top of the dam will be removed and properly disposed of. In addition, the Missouri Department of Natural Resources will be asked to check their records for the presence of any active or abandoned solid or hazardous waste or leaking underground storage tank sites within the Little Otter Creek watershed. Appropriate action will be taken to assure that the risk of any discharge to the reservoir is minimized.

Comment 5 – The east/west gravel road located approximately 0.75 miles north of the proposed Reservoir LO-1 embankment will be closed due to inundation by the reservoir's permanent pool. The low point of the east/west road located approximately 1.75 miles north of the embankment is approximately 2.0 feet above permanent pool elevation. The bridge and roadway will be modified as needed to raise the road surface to an appropriate elevation above permanent pool. The Highway 36 bridge, approximately 2.25 miles north of the embankment will not be effected by permanent water. MODOT will be consulted prior to construction to determine if toe rock or other measures are needed to provide protection of the Highway 36 fill material from auxiliary spillway or top of dam water.

Wetland Impacts

The wetland acres identified in the plan that will be impacted by the project are preliminary as this time and are based on the best available data using offsite methods. Prior to the start of any construction activities, a certified wetland determination will be conducted onsite within the project area and these data will be used to obtain the necessary federal and state permits which will include mitigation for any wetland impacts.

Stream Impacts

Mitigation for all of the stream reach lost to reservoir inundation will be addressed through the U.S. Army Corps of Engineers 404 and Missouri Department of Natural Resources 401 permit process. Mitigation measures could include, but are not limited to, long term easements on riparian areas in the watershed and/or cash payments to the Stream Stewardship Fund. Mitigation measures will be agreed to prior to the issuance of the necessary project permits and prior to the start of construction activities.

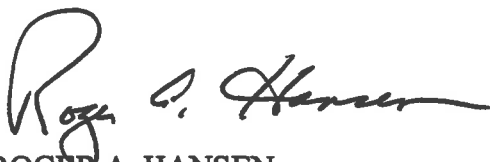
A 3.8 mile reach of Little Otter Creek downstream of the reservoir outlet will be impacted once construction starts and will continue to be impacted by very low or no flow until the reservoir is full. Flow conditions are likely to be altered in the downstream reach following installation of the reservoir. Prior to obtaining necessary project permits and prior to the start of construction, NRCS will convene a working group comprised of relevant state and federal personnel, as well as the project Sponsors, to address mitigation for the impact to stream habitat. Storage is included in the planning design of the reservoir to provide flow augmentation to the downstream reach. This storage is a planning estimate (based on regional data provided by USGS) and does not necessarily reflect on the actual storage that will be included in the final reservoir design.

Water temperatures in the stream below the reservoir may be changed. Assuming there is a surface discharge, water temperature could be warmed during the summer months. It is unknown how far downstream water temperatures will be effected. Little Otter Creek is generally shaded and the water should cool fairly quickly. Flow augmentation should also help keep water temperatures moderated. Dissolved oxygen should not be an issue provided there is a surface discharge from the structure. Changes in fish diversity below the reservoir may occur and changes in flow regime and temperature may adversely affect sensitive stream species. Mitigation measures will help minimize such impacts. Some predatory fish, such as largemouth bass, crappie, and bluegill will likely escape the reservoir through the spillway and enter the stream.

Endangered Species

The Section 7 process was followed and MDC and USFWS were consulted regarding any species that are listed or are proposed for listing that may be present in the watershed or impacted by the project. As per the responses from the USFWS and MDC the Topeka shiner and Stonecat Madtom were not found in the watershed. MDC also conducted a fish survey of Little Otter Creek and no Topeka shiners were collected. According to personnel at MDC Fisheries Research, the Stonecat Madtom is not listed on the federal or state endangered species lists. NRCS has discussed the issue of the Topeka shiner with the USFWS and additional narrative is now included in the EIS about this species.

Thank you for your review and comments of the draft Plan-EIS. Your office will receive a copy of the final plan when it is completed. If there are further questions or comments, please contact Harold Deckerd, Assistant State Conservationist at (573) 876-0912.



ROGER A. HANSEN
State Conservationist

cc: Harold Deckerd, ASTC, NRCS, Columbia, MO
Rob Cheshier, Geologist, NRCS, Columbia, MO

AUG 14 2002

*Missouri
Department
of Transportation*



105 West Capitol Avenue
P.O. Box 270
Jefferson City, MO 65102
(573) 751-2551
Fax (573) 751-6555
www.modot.state.mo.us

Henry Hungerbeeler, Director

August 9, 2002

Mr. Roger Hansen
State Conservationist
Natural Resources Conservation Service
U.S. Department of Agriculture
Parkade Center, Suite 250
601 Business Loop 70 West
Columbia, MO 65203

Dear Mr. Hansen:

SUBJECT: Draft Watershed Plan – Environmental Impact Statement
Little Otter Creek Watershed
Caldwell County, Missouri

We have reviewed the draft Watershed Plan – Environmental Impact Statement (DEIS) for the proposed project within the Little Otter Creek watershed in Caldwell County. Mark Kross of my staff, who also received the DEIS, offers the comments below. These are divided into transportation-related comments and other general comments about the project and the DEIS.

Transportation-related comments

1. It appears that only one local road (county-maintained?) will be closed by construction and filling of the reservoir. However, U.S. Route 36 is situated to the north and is above the permanent pool elevation and below the elevation of the top of the dam. There are no specifics about the precise conditions at U.S. Route 36 once the reservoir is in place. Will the highway be above water during potential severe flooding conditions? Is there a possibility our highway fill could become saturated and unstable, threatening the integrity of the highway?
2. The DEIS indicates that the current average annual damage to roads and bridges is estimated to be \$14,000. However, the DEIS does not specify where this damage occurs. Is some of the \$14,000 damage on facilities that will become inundated by the proposed reservoir? If so, then it seems a portion of benefits for the project would become irrelevant since that road and any associated bridge(s) would no longer be in service. Clarification of this would help.

3. Page 25 indicates that 695 acres of land will be purchased. The site for the 362-acre reservoir is indicated on maps within the DEIS. However, the location of the 319-acre mitigation area surrounding the reservoir is not identified. Are we to assume that the 319 acres is the land between the top of the permanent pool and below the top of the dam elevation? Adding 362 to 319 yields 681 acres. Where are the additional 14 acres (to get the total of 695) and what will these lands be used for? Another different breakdown of the acreage is indicated on Page 39. This matter should be clarified in the DEIS, including a map, and especially since we cannot say how transportation will be affected if we do not know the true project area.
4. On Page 37, the DEIS reads, "Prescribed burning that is consistent with wildlife habitat enhancement may be performed on the mitigation area, embankment, spillway and adjacent grassland." Because U.S. Route 36 and Caldwell County Route B are downwind from the project site, any blowing smoke crossing those highways threatens the safety of travelers. This must be considered in your planning and in your ultimate management of the reservoir.
5. If a dam is constructed and a breach occurs, what impacts might be expected at Route U, downstream from the dam on Little Otter Creek? The Breach Inundation Map in Appendix C indicates you have two breach inundation cross-sections along Route U, but there is no indication if the highway might be overtopped and/or washed out by any breach.
6. The DEIS does not indicate where the "raw water lines" are proposed. Since these lines might have to cross MoDOT right of way and require a permit from us, details would be helpful.

David Ahlvers is our District Engineer in MoDOT's St. Joseph District Office. I recommend coordinating with his office on issues above related to state highways. The address there is 3602 North Belt Highway, P.O. Box 287, St. Joseph, MO 64502. The office telephone is 816-387-2350.

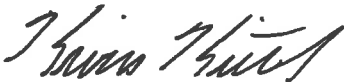
General comments

7. The environmental impacts of the installation and maintenance of the raw water lines should be addressed in this DEIS and the subsequent Final EIS.
8. Pages 28 and 29 indicate a conversion of Conservation Reserve Program (CRP) fields to crop fields that is deemed a "significant concern." This concern is not clearly described in the DEIS. Does reservoir construction mean there is a threat of such conversion beyond the project area? If so, that should be covered in a section about the secondary and cumulative impacts of the reservoir construction and operation.

9. Page 31 shows Table G and the comparison of alternative plans. Does the information for the recommended plan in Table G include only the 362-acre lake or else the whole 695-acre project?
10. Page 35 mentions the reports done by the Green Hills Regional Planning Commission and the reservoir option study by Allstate Consultants. A summation of details from both reports would make the purpose and need stronger and would help justify the project.
11. Were other reservoir sites in Caldwell County (or in neighboring counties) screened? If so, summarizing that screening process would allow the public and the decision makers to understand why the proposed reservoir site is preferred and why it is the only option being proposed, other than the "without project" option.

We appreciate the opportunity to comment on the DEIS during this interagency review. We look forward to further interaction with you on this project. Please send copies of the draft version of the Final EIS to Mark Kross, David Ahlvers and me at our respective addresses.

Sincerely,



Kevin Keith, P.E.
Chief Engineer

kk/msk-pd

Copies: Mr. David Ahlvers-lao
Mr. Mark Kross-pd
Mr. Matt Burcham-de

J:\krossm\NRCS CaldDeis.doc



Natural Resources Conservation Service
Parkade Center, Suite 250, 601 Business Loop 70 West
Columbia, Missouri 65203

February 5, 2003

Kevin Keith, P.E., Chief Engineer
Missouri Department of Transportation
105 West Capitol Avenue
P.O. Box 270
Jefferson City, Missouri 65102

Dear Mr. Keith:

This letter responds to your comments on the Draft Little Otter Creek Watershed Plan-EIS.

Comment 1 – Planning data for Reservoir LO-1 includes elevations of 855.1 for permanent pool, 860.6 for the auxiliary spillway, and 868.1 for top of dam. Our surveys show elevations at U.S. Route 36 to be 860.7 for the outlet invert of the box culverts and 880.5 for the low point of the road. Consequently, permanent pool would not impact the highway. The auxiliary spillway level (1% chance storm) would be approximately at the outlet invert elevation, and the top of dam level would be approximately 7 feet above the outlet invert elevation. Water at the top of dam elevation has an extremely small chance of occurrence. Water surface elevations may change slightly after final designs are completed for Reservoir LO-1. MODOT will be consulted prior to construction to obtain all necessary permits and approvals and to determine if toe rock or other measures are needed to provide protection of the Highway 36 fill material.

Comment 2 – For the analysis of damages to roads and bridges, only those areas downstream of the proposed reservoir were included. While some damages undoubtedly occur to infrastructure above the proposed dam, they were considered minor and were not deemed significant for the economic analysis.

Comment 3 – The majority of mitigation acres will be located between the permanent pool elevation and the elevation of the crest of the auxiliary spillway. Additional acres will be acquired for recreational facilities. This total area is 333 acres of which 319 will be mitigation area. The additional 14 acres is included in the 191 acres of buffer and is the estimated acreage that will be occupied by the recreational facilities (nature trail, parking lots, restroom facilities, shelterhouse, access road, etc.). NRCS will recommend that the Sponsors give consideration to acquiring additional landrights to cover an area to the top of dam elevation. These additional real property rights would provide an extra 72 acres of vegetative buffer.

Comment 4 – Prior to any scheduled burn, NRCS and/or MDC personnel with appropriate job authority will develop an official burn plan. Wind direction, humidity, and other environmental factors will be taken into consideration. Safety of motorists using roads that could be effected is of utmost importance. If necessary, personnel will be stationed on roadways to direct traffic and insure the safety of travelers.

Comment 5 – Breach analysis indicates that should a breach of the proposed structure occur, Route U would be inundated with 10.7 feet of water with a discharge of 85,000 cfs. This would very likely

cause damage to the road. Extent of such damage is unknown. However, the design of the structure will be based on class (c) hydrologic criteria. It will be designed to safely convey the runoff from the probable maximum precipitation storm through the structure without extensive damage. Chances of a breach are extremely small.

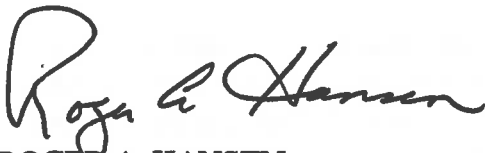
Comments 6 & 7 – Raw water lines that are within the scope of the Little Otter Creek Watershed Plan will consist only of lines from the water intake tower to a location a short distance downstream of the Reservoir LO-1 embankment (less than 200 feet). These lines will be stubbed off for future hookup to lines from the treatment plant. Consequently, no MODOT right of ways will be crossed and no additional environmental impacts will be incurred since the work will fall within the work limits of the Little Otter Creek project.

Comment 8 - It is expected that implementation of the Little Otter Creek Watershed project will reduce the negative impact from the conversion of expiring CRP contracts through accelerated information and education efforts and potential eligibility for new conservation programs. There is significant concern that "Future Without Project" conditions may result in more soil erosion and water quality impairment as land currently enrolled in CRP is converted to cropland when the 10-year contracts expire.

Comment 9 – Information for the recommended plan that appears in Table G (Table H in future edits) applies to differing portions of the Little Otter Creek Watershed. For example, information concerning fish and wildlife habitat applies to the 695 acres to be acquired, as well as those areas downstream of the reservoir. Information related to erosion and sediment reduction applies to the entire watershed. Information on insufficient recreational opportunities applies to the reservoir and those surrounding areas that will be managed as recreational areas.

Comment 10 & 11 – The following portions of the Plan-EIS have been supplemented with additional narratives: the sections entitled "Alternatives Considered but Eliminated from Detailed Study" and "Agricultural Water Management (Rural Water Supply)" in the Formulation and Comparison of Alternatives portion of the Plan-EIS and the section entitled "Agricultural Water Management (Rural Water Supply)" in the Watershed Problems and Opportunities portion. These sections now contain additional narratives and information from Allstate Consultants; Allgeier, Martin, and Associates; the Green Hills Regional Planning Commission; and the Missouri Division of Geological Survey and Water Resources. This information details current water usage, projected usage, problems associated with obtaining water from other sources, consideration and dismissal of other sites in the watershed, and provides support for the elimination of other alternatives from consideration.

Thank you for your review and comments of the draft Plan-EIS. Your office will receive a copy of the final plan when it is completed. If there are further questions or comments, please contact Harold Deckerd, Assistant State Conservationist at (573) 876-0912.



ROGER A. HANSEN
State Conservationist

cc: Harold Deckerd, ASTC, NRCS, Columbia, MO
Rob Cheshier, Geologist, NRCS, Columbia, MO



MAR 30 2003

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

Mr. Roger A. Hansen, State Conservationist
USDA - Natural Resource Conservation Service
Parkdale Center, Suite 250
601 Business Loop 70 West
Columbia, MO 65303

Dear Mr. Hansen:

Re: Final Environmental Impact Statement (FEIS) for the Little Otter Creek Watershed Plan in
Caldwell County, MO.

This letter is to confirm that the U.S. Environmental Protection Agency (EPA) has reviewed the FEIS for the Little Otter Creek Watershed Plan dated March 5, 2003. Our review is provided pursuant to the National Environmental Policy Act (NEPA) 42 U.S.C. 4231, Council on Environmental Quality (CEQ) regulations 40 C.F.R. Parts 1500-1508, and Section 309 of the Clean Air Act (CAA). The FEIS was assigned the Council on Environmental Quality (CEQ) number 030117.

Our review of the April 2002 Draft Environmental Impact Statement for this project resulted in a rating of "LO" (Lack of Objections). The rating was based on the preferred alternative for the watershed plan meeting the overall purpose and need of the project. In that review EPA provided comments related to land acquisition, watershed conservation programs, and aquatic habitat to improve the decision-making value of the FEIS. After the review of this final document, EPA observes that these issues have been revisited.

EPA commends the work of all those persons and agencies involved in the process leading to the development of the FEIS. We would also like to extend our help to land owners in the project area by providing watershed educational assistance through EPA's Clean Water Act Section 319 Water Quality Program. If you have any questions or concerns about the NEPA process or the §319 Water Quality Program, please contact me at (913) 551-7805.

Sincerely,

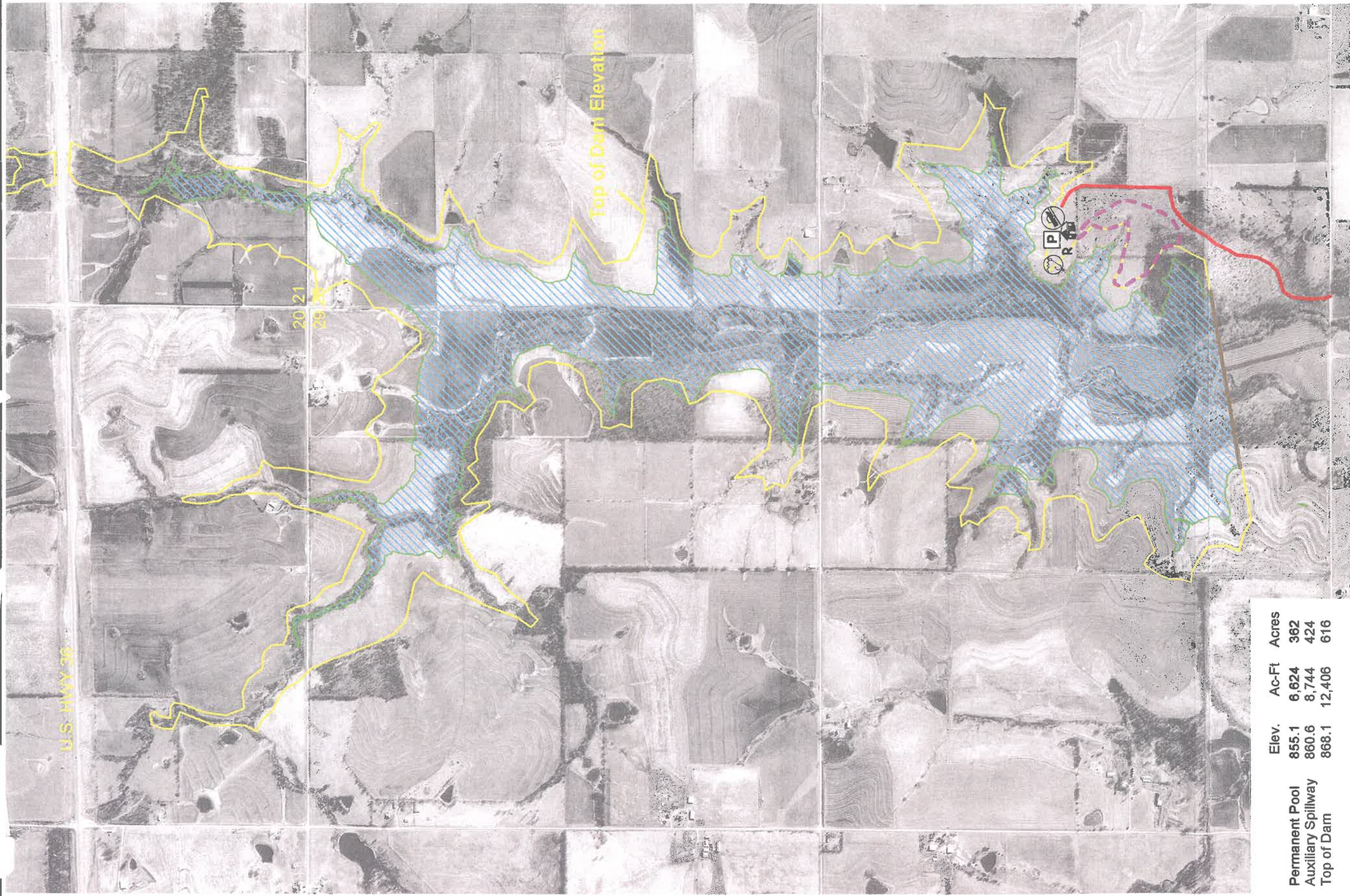
NICHOLAS ROCHA

Nicholas Rocha
NEPA Reviewer
Environmental Services Division



APPENDIX B

Site and Recreational Facilities Map



U.S. HWY 36

20 21
29 30

Top of Dam Elevation

Permanent Pool	Elev.	Ac-Ft	Acres
Auxiliary Spillway	855.1	6,624	362
Top of Dam	860.6	8,744	424
	868.1	12,406	616

Little Otter Creek - Reservoir LO-1 Site and Recreational Facilities Map

April 2002



- Parking Area
- Shelter
- Fishing Pier
- Boat Ramp
- Restrooms

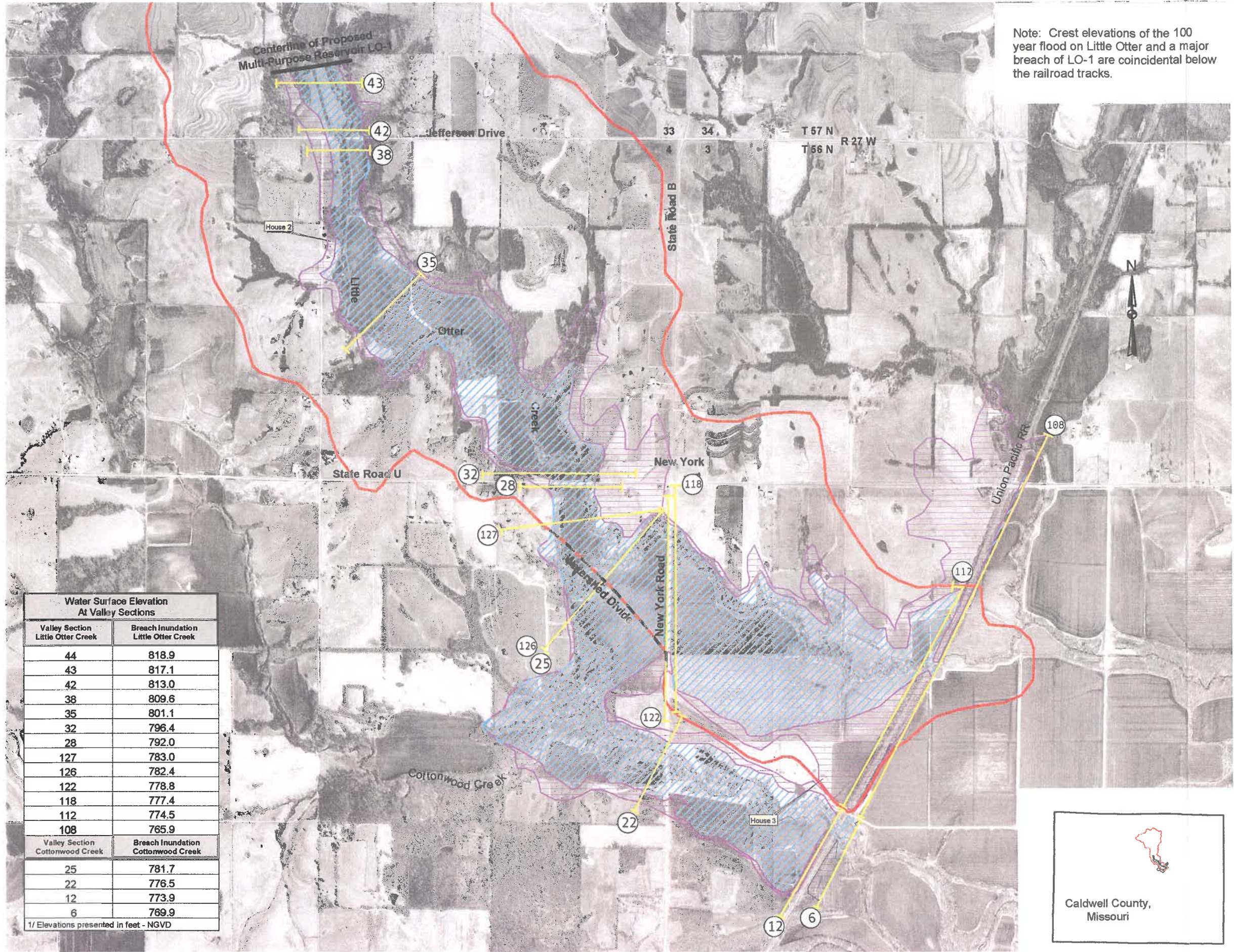
- Trail
- Access Road
- Proposed Dam
- Top of Dam Elevation
- Permanent Pool



NRCS Natural Resources Conservation Service

APPENDIX C

Breach Inundation Map



Water Surface Elevation At Valley Sections	
Valley Section Little Otter Creek	Breach Inundation Little Otter Creek
44	818.9
43	817.1
42	813.0
38	809.6
35	801.1
32	796.4
28	792.0
127	783.0
126	782.4
122	778.8
118	777.4
112	774.5
108	765.9
Valley Section Cottonwood Creek	Breach Inundation Cottonwood Creek
25	781.7
22	776.5
12	773.9
6	769.9

1/ Elevations presented in feet - NGVD

Breach Inundation Map Little Otter Creek Watershed

Caldwell County, Missouri

United States Department of Agriculture
Natural Resources Conservation Service

- 100-year flood area
- Breach area
- Valley Sections
- Watershed Boundary

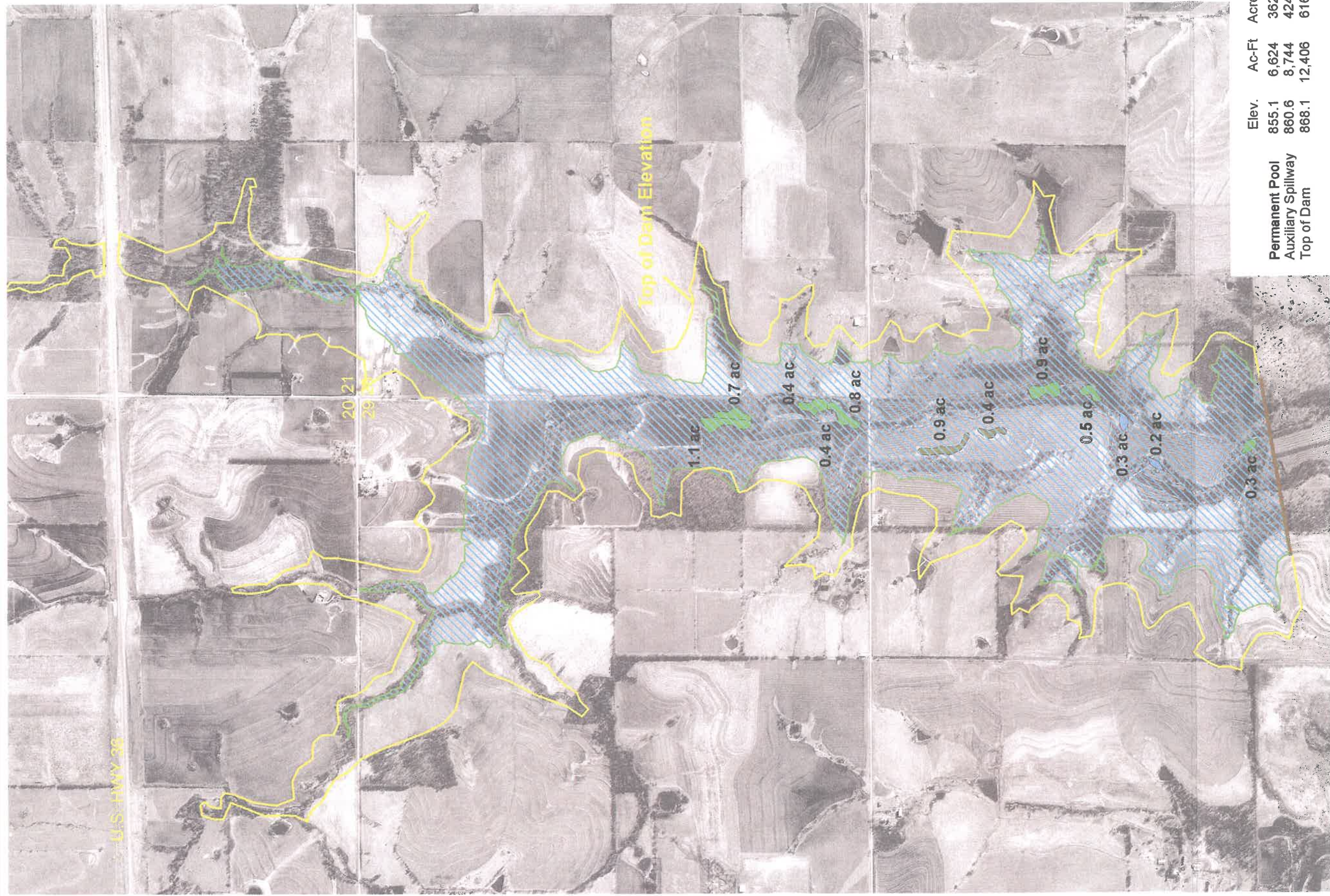
Scale 1 inch = 1500 feet
April 2002

APPENDIX D

National Wetlands Inventory Map

and

Wetlands Identified by Farm Bill Wetland Inventory Map



	Elev.	Ac-Ft	Acres
Permanent Pool	855.1	6,624	362
Auxiliary Spillway	860.6	8,744	424
Top of Dam	868.1	12,406	616

Little Otter Creek - Reservoir LO-1 National Wetlands Inventory Map

NWI Classification:

- Palustrine Emergent Seasonally Flooded (PEMC) - 1.3 acres
- Palustrine Forested Broad-Leaved Deciduous
- Temporarily Flooded (PFO1A) - 5.1 acres
- Riverine Lower Perennial Unconsolidated Shore
- Temporarily Flooded (R2USA) - 0.5 acres

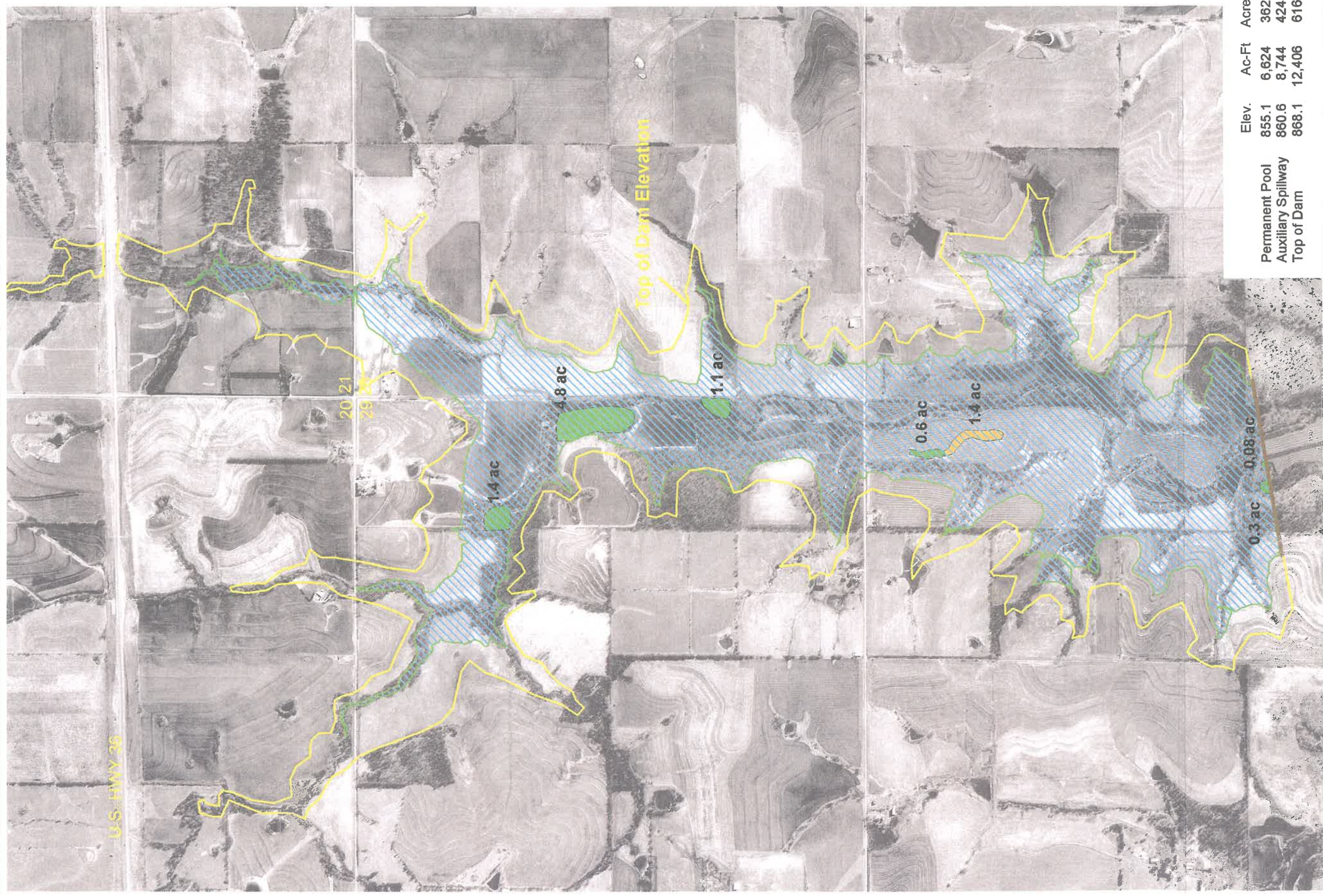
- Proposed Dam
- Top of Dam Elevation
- Permanent Pool



600 0 600 1200 Feet



Caldwell County,
Missouri

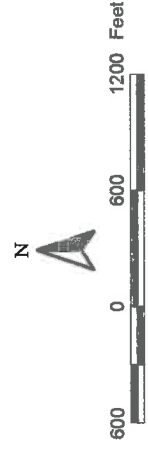


Little Otter Creek - Reservoir LO-1 **Wetlands Identified by Farm Bill Wetland Inventory**

December 2002

- Farmed Wetlands - 1.4 acres
- Wooded Wetlands - 8.28 acres

- Proposed Dam
- Top of Dam Elevation
- Permanent Pool



Caldwell County,
Missouri

	Elev.	Ac-Ft	Acres
Permanent Pool	855.1	6,624	362
Auxiliary Spillway	860.6	8,744	424
Top of Dam	868.1	12,406	616

APPENDIX E

Investigations and Analyses

INVESTIGATIONS AND ANALYSES

The purpose of this section is to present information that supports the formulation, evaluation, and conclusions of the watershed plan. Items of a routine nature are not included. However, citations are included throughout the Watershed Plan-Environmental Impact Statement text for appropriate manuals, handbooks, research, and other references. Supporting data developed for this study are on file at the Natural Resources Conservation Service state office in Columbia, Missouri.

HYDRAULICS AND HYDROLOGY

Channel and Valley Cross-Sections

Preliminary locations were identified by examining aerial photographs and USGS 7.5 minute topographic maps. Final locations were determined after making field examinations of hydraulic characteristics and considering the needs of the economist and geologist.

Field surveys were made by NRCS survey crews. A total of 20 channel and valley cross-sections and 7 bridges were surveyed. Cross-section data were developed using the field surveys. These cross-sections were used for hydraulic determinations, economic analysis, and damage studies.

Hydraulics

Water surface profiles were developed using the Hydraulic Engineering Center River Analysis System (HEC-RAS) water surface profile computer model. This program develops elevation-discharge and elevation-area flooded relationships used for hydrologic and economic analysis.

Manning's roughness coefficient "n" was determined by field examination and the NRCS National Engineering Handbook, Part 630, Supplement B, in conjunction with the publication "Guide for Selecting Roughness Coefficient "n" Values for Channels". Floodplain "n" values were based on the land use in the floodplain. Factors affecting hydraulic characteristics of bridges were obtained from HEC-RAS and the publications referenced in it.

Hydrology

The hydrologic condition was determined by using the digital soil survey for Caldwell County. Hydrologic soil groups and land cover were combined via GIS and summarized by cross-section subwatersheds. The future hydrologic condition of the watershed was based on information furnished by Caldwell County officials and the NRCS district conservationist concerning land use changes expected during the installation and operation period. Runoff curve numbers were computed from the soil cover complex data and used with Figure 10.1 in the NRCS National Engineering Handbook, Part 630, in order to determine the depth of runoff from single storm events.

Weather Bureau Technical Paper No. 40 was used to determine the amount and frequency of rainfall for storms of 24-hour duration. These rainfall amounts were for frequencies ranging from 1 to 500 years.

Project Formulation-Hydrology (TR-20), version PC 2/92 (2.04) was used to estimate peak discharges for an array of frequencies at each cross-section location. Floodplain width and area flooded were adjusted against the 100-year flood.

Time of concentration for each dam and intervening drainage area was computed using procedures in SCS TR-55, Urban Hydrology for Small Watersheds.

ENGINEERING DESIGN AND COST ESTIMATES

The basis and criteria for planning and design of structural measures are contained in the following documents, manuals, and guides: National Watershed Manual; National Engineering Manual; NRCS Engineering Field Manual; Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies; Technical Releases 19, 20, 48, 52, 55, 60, 66; and National Engineering Handbooks.

The major problems identified by the Sponsors of the Little Otter Creek Watershed project are rural water supply shortages, lack of fish and wildlife developments, and damages due to flooding.

Early planning activities included field investigations and observation trips by an interdisciplinary team to identify and evaluate the natural resources of concern in their present conditions.

Formulation of multiple-purpose Reservoir LO-1 included agricultural water management (rural water supply), recreational facilities, and flood prevention for Caldwell County. Allocation of installation costs for the multiple-purpose reservoir to the specific purposes was accomplished by using the Separable Cost-Remaining Benefits (SCRB) procedure. A worksheet was developed for this allocation procedure using Excel software. The worksheet was expanded to incorporate development and preparation of Table 2A for the plan.

Planning design for Reservoir LO-1 was prepared with data taken from 4-foot contour interval topographic maps prepared by Western Air Maps, Inc. with a scale of 1:2,400. A field survey of the centerline profile was taken and checked with the profile prepared from USGS topographic maps. The profiles compared favorably. Profiles were also taken of roads that cross the valley. These also checked favorably. Reservoir LO-1, as planned, will require the closing of one public road and relocation of one home.

Geologic data from a preliminary foundation investigation, utilizing backhoe pits and core drillings, were used to develop foundation treatment recommendations.

The principal spillway is planned to be reinforced concrete pipe with a reinforced concrete riser and a vegetated earth emergency spillway. The emergency spillway will be located in the right abutment.

Special emphasis was placed on identifying potential sources of nutrients and pesticides in the watershed of the reservoir. Details of this investigation are found in this Appendix under the Water Quality section.

Total storage in the reservoir at the auxiliary spillway crest is 8,744 acre-feet. This storage is made up of 684 acre-feet for submerged sediment, 120 acre-feet for aerated sediment, 4,920 acre-feet for agricultural water management (rural water supply), 900 acre-feet for the recreation pool, and 2,120 acre-feet for floodwater retention. Total storage at the top of dam is 12,406 acre-feet.

The reservoir includes 6,624 acre-feet of storage at the principal spillway crest, of which 4,920 acre-feet is for agricultural water management (rural water supply). This amount was determined by analysis of the present and projected demand and through input from representatives of the Caldwell County Lake Project Steering Committee and the Caldwell County Commission. The watershed yield and reservoir operation was analyzed using TR-19, Reservoir Operation Study Program. The reservoir performance was evaluated against the drought period of 1950-1959, considered to be the most severe drought period in recent times. According to the study, the reservoir yield will average 1,240,000 gallons per day.

In order to supply flow augmentation needs to minimize impacts to stream habitat of Little Otter Creek downstream of reservoir LO-1, a discharge of 60 gallons per minute was included in the planning-phase design. Storage for this flow is included in the agricultural water management (rural water supply) segment of the permanent pool. This discharge is based on regional data provided by USGS and the actual discharge may change in the final reservoir design.

GEOLOGY

Erosion and sedimentation data concerning sheet-and-rill, ephemeral gully, classical gully, and road ditch erosion for upland areas of the Little Otter Creek Watershed were compiled based on field observations, information provided by NRCS and SWCD field personnel, and quantified, digital common land unit (CLU) data for Caldwell County derived by GIS analysis.

Channel conditions and streambank erosion were inventoried at the surveyed valley cross-sections and at randomly selected stream reaches. Bedload materials and sediment transport potential were evaluated along Little Otter Creek and its major tributaries. Changes in channel planform (geomorphic adjustment) were assessed by examination of historical aerial photography and through interviews with local residents.

Reconnaissance geologic investigations were conducted of possible reservoir impoundment sites. Water holding potential and availability of borrow materials were assessed. A preliminary, geologic, foundation investigation of the selected site, LO-1, was conducted using backhoe pits and core drillings. Encountered bedrock units were pressure tested to evaluate water holding potential. Samples of borrow and foundation materials were collected and analyzed by the NRCS Soil Mechanics Laboratory.

BIOLOGY

Field investigations of upland wildlife habitat and aquatic habitat impacted by this project were conducted by a tri-agency team composed of biologists from the U.S. Fish and Wildlife Service (USFWS), Missouri Department of Conservation (MDC), and the Natural Resources Conservation Service (NRCS). Team members agreed to use representative species and three habitat types (grassland, upland hardwoods, and bottomland hardwoods) for the evaluation. Wildlife Habitat Appraisal Guide (WHAG) software was used to model the range of species niche requirements and habitat conditions impacted by the project. The WHAG software allowed us to assess the various habitat types to be impacted for 14 different species with niche requirements that represented all of these habitat types. Based on the field data collected, the tri-agency team agreed that the bobwhite quail habitat suitability index (HSI) would be used to assess the loss of the upland habitats to be impacted. The use of the quail HSI provided the greatest number of mitigation acres. These mitigation acres will not be developed solely for bobwhite quail, but rather will adequately compensate for the various habitats impacted and emphasize the species that require these habitat types. NRCS will develop such a mitigation plan for these mitigation acres with MDC and USFWS.

Based on a field investigation utilizing WHAG, the team decided that native grassland and woody cover were the most valuable habitat types. Acres impacted of each habitat type affected were measured utilizing digital orthophotography. The team agreed that the bobwhite quail habitat suitability index (HSI) model would be used as the indicator of impacts on grassland and woody draws. The team agreed that losses of pasture/hayland for construction of the reservoir could be offset by fencing the impoundment and eliminating grazing, since undisturbed grass on the impoundment would provide better quality habitat than overgrazed pasture that is temporarily flooded.

Threatened and endangered species, potential wetland impacts, significant natural communities, and other environmental concerns will be addressed during the pre-design conference and other pre-contract meetings.

WETLANDS

Wetland acres were determined using digital Fish and Wildlife Service National Wetland Inventory maps and Farm Bill Wetland Inventory maps. A certified wetland determination will be conducted prior to construction.

STREAM RESOURCES

Fish samples were collected with a seine from three locations within the proposed pool area of Reservoir LO-1. Missouri Department of Conservation fisheries biologists collected these samples during the spring of 2001.

Flow regime information was determined using a Modified Wetted Perimeter Method. Habitat and flow measurements were collected during 2001 and 2002 by a Missouri Department of Conservation stream habitat specialist and a watershed biologist.

Aquatic GAP, which was developed at MORAP, uses 7 valley segment variables to classify streams within ecological drainage units (EDU). These variables are temperature, stream size, flow, geology, relative gradient, valley wall interaction, and size discrepancy. The 2 variables that are the most important and account for a majority of the separation in the classification system are relative gradient and stream size.

Aquatic GAP links stream valley segment classification with biological samples collected from streams in the same ecological drainage unit to predict what species and/or aquatic communities would be expected to occur in a given stream. Aquatic GAP was used to compare the species of fish collected from other streams of similar size and relative gradient within the Plains-Grand-Chariton EDU to predict what species of fish would be expected to occur in Little Otter Creek. Aquatic GAP also uses a watershed classification system to compare watersheds within ecological drainage units.

CULTURAL RESOURCES

A cultural resources review was made of the proposed project area by the Missouri Cultural Resources Specialist (CRS). Elements of the review included a field survey of more than 300 acres of proposed dam and pool areas by the CRS and two assistants. The survey was conducted by walking transits approximately 10 meters apart. Eroding streambanks were examined by the CRS during a separate visit to determine the potential for buried sites. If significant resources are discovered during project implementation, NRCS procedures for compliance with federal laws and executive orders will be implemented to protect important resource information. Cultural resources concerns will be coordinated with the State Historic Preservation Office, Tribal Historic Preservation Offices, other tribes, and interested parties.

SOCIAL RESOURCES

Sources for the social assessment and civil rights impact analysis include documented research data and interviews with local residents and local officials. Weighted averages were used for assessment purposes when specific watershed census data were not available.

ECONOMICS

The economic methodology used to evaluate the average annual damages, benefits, and costs are from the NRCS document, "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies". This document, signed by the President in 1983, provides consistent formulation and evaluation procedure guidelines for water and related land resource implementation studies planned by federal agencies.

The basis for evaluating the benefits from agricultural water management (rural water supply) is society's willingness to pay for the increase in the value of goods and services attributable to the water supply. The local Sponsors are willing to pay for the increase in costs of the structure to provide for a water supply pool. Allstate Consultants (January 2002) estimated the cost of the needed water supply reservoir at \$2,500,000. This exceeds the local share needed for the federal water supply. Therefore, the Recommended Plan is the least cost method of providing the rural water supply facilities to Caldwell County. The cost of the increase is society's willingness to pay and is the benefit to that portion of the lake dedicated to that purpose.

Benefits for recreation were evaluated using the unit-day value method, as described in the U.S. Water Resources Council's "Principles and Guidelines", Section VII, Appendix 3.

Damage reduction benefits for crop and pasture, fence, debris, and roads and bridges were determined by computing the difference in damages for the future without-project condition and remaining damages expected with each alternative in place. The basis for the assumptions concerning future without-project and future with-project conditions are covered in the plan under "Effects of Alternative Plans".

National Economic Development Plan (NED)

The major objective outlined by the local watershed Sponsors is to provide rural water supply, reduce flood damages, and provide recreational opportunities. Principles and Guidelines requires analyzing a plan that maximizes net benefits. This plan is called the NED plan and is the selected plan.

Installation Costs

Installation costs of the structural measures are amortized at 6.125 percent interest. The reservoir is evaluated to have a 100-year life. Average annual costs include both installation costs and operation and maintenance costs.

RECREATION

The unit-day value method, as described in the U.S. Water Resources Council's "Principles and Guidelines", Section VII, Appendix 3, was used to evaluate recreation benefits.

A team made up of federal, state, and local representatives determined points for general recreation required by the methodology described. Participation rates were determined using figures generated by the Missouri Statewide Comprehensive Outdoor Recreation Plan. Recreation user-day point values were determined as shown on page 84 of the federal Principles and Guidelines publication. Values were updated to current levels by the consumers' price index.

LAND COVER AND TREATMENT

Land cover information came from the Caldwell County digital common land unit (CLU) theme, produced by the Farm Service Agency's CLU digitizing center. The CLU is a delineation of agricultural land into ownership and management boundaries. The CLU is attributed with farm, tract, and field numbers from historic involvement in USDA programs. Non-agricultural and non-program lands are also delineated and given a land cover code, determined by aerial photography interpretation.

All program acres in the Little Otter Creek watershed were subsequently attributed by the Caldwell County NRCS staff with a 5-year cropping history. The combination of the cropping history and land cover codes provided high-resolution land cover data for the watershed. The Caldwell County NRCS staff also calculated a USLE value for most agricultural CLUs in the watershed. To determine acres in the watershed considered "treated", or with an acceptable soil loss rate, USLE values were compared to the soil loss tolerance factor (T) from the digital Caldwell County soil survey. For the comparison, each CLU was assigned the T value for the surface layer of the dominant soil map unit in the CLU. The CLU was considered "treated" if its calculated USLE was less than T, and "untreated" if USLE was greater than or equal to T.

Digital soil map units were attributed with their flooding frequency attribute from the soil survey (frequent, occasional, rare, and never). Frequent and occasionally flooding areas were used to define a floodplain for the watershed. Land cover statistics were categorized into upland and floodplain.

PROJECT FORMULATION

Future without-project conditions were forecasted using present conditions as a base. An interdisciplinary team approach, interviews of local officials and residents, and input from the Little Otter Creek Steering Committee were used to reflect a cross-section of viewpoints. Structural and nonstructural measures were evaluated in order to address local project purposes.

The major project objective, as determined by the Sponsors and through local input, is to find solutions to the following resource problems: an inadequate, undependable water supply for Caldwell County and surrounding municipalities; lack of recreational facilities, public fishing, and wildlife habitat; and flooding along Little Otter Creek. It was determined that one multiple-purpose reservoir situated on Little Otter Creek would best meet local project needs.

PUBLIC PARTICIPATION

In July 2000, in response to local concerns about inadequate water supply and repetitive flooding problems along Little Otter Creek, the Caldwell County Commission requested assistance through the Watershed Protection and Flood Prevention Act, Public Law 83-566.

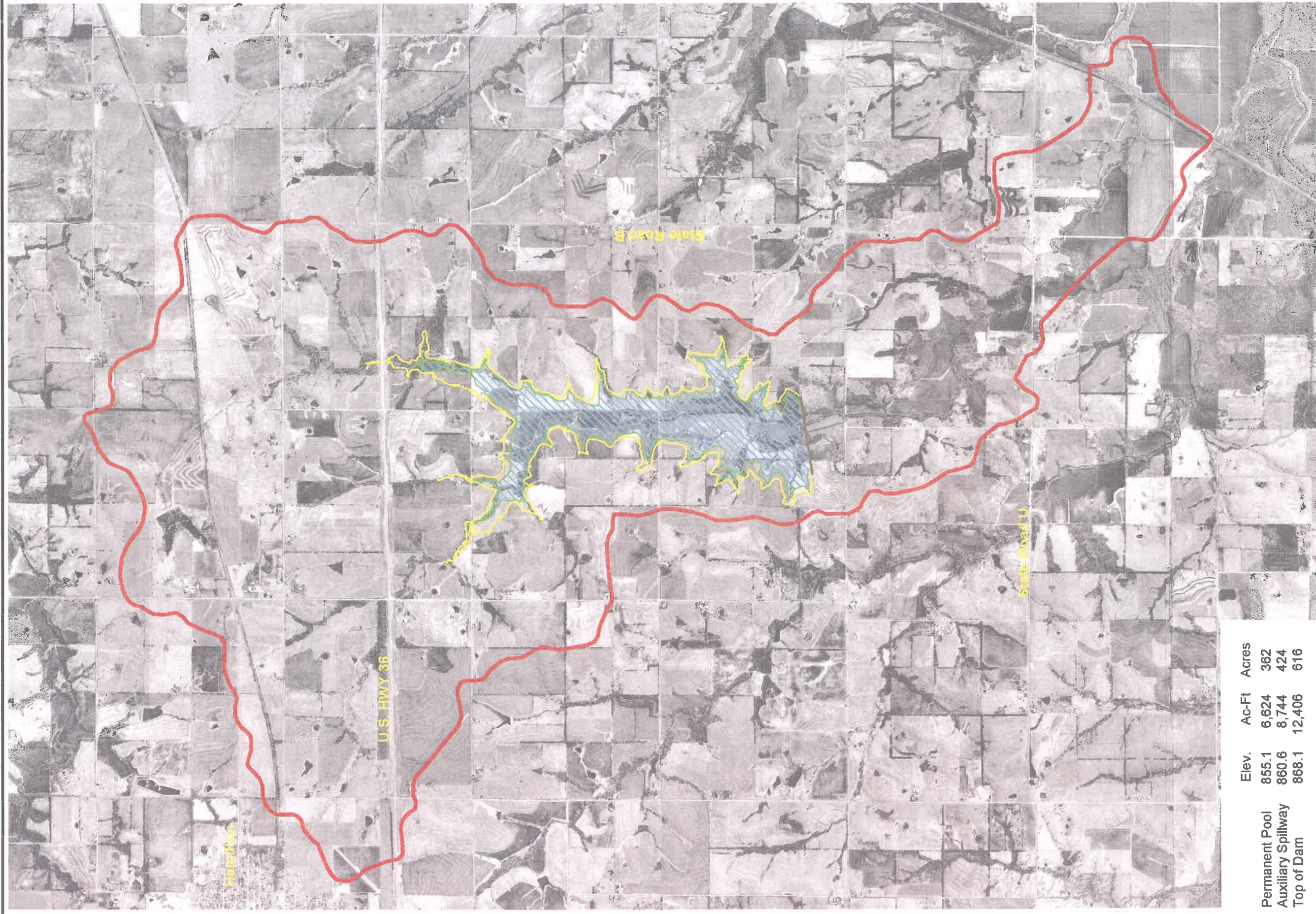
Numerous scoping meetings were held to gather public input and keep the community informed on the status of project planning activities. Several community surveys and interviews were conducted to gather information, and periodic news articles were published to update local citizens. The Caldwell County Lake Project Steering Committee was formed to further insure public input into the planning process.

**EFFECTS OF THE RECOMMENDED PLAN
ON RESOURCES OF NATIONAL RECOGNITION**

Types of Resources	Authorities	Measurement of Effects
Air quality	Clean Air Act, as amended (42 U.S.C. 7401 et. seq.)	Short-term impacts from exhaust emissions, smoke, and dust during construction activities.
Area of particular concern within the coastal zone	Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1451 et.seq.)	Not present in planning area.
Endangered & threatened species, critical habitat	Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et. seq.)	No negative effects anticipated.
Wildlife habitat	Fish and Wildlife Coordination Act (16 U.S.C. Sec. 661 et. seq.)	Overall increase in quality of wildlife habitat.
Floodplain	Executive Order 11988, Floodplain Management	Reduced damages.
Cultural resources	National Historic Preservation Act of 1966, (16 U.S.C. Sec. 470 et. seq.)	No historic properties will be affected.
Prime & unique farmland	CEQ Memorandum of August 1, 1980: Analyses of impacts on prime or unique agricultural lands in implementing NEPA	No effect.
Water quality	Clean Water Act of 1977	Short-term decline in water quality during construction activities.
Wetlands	Executive Order 11990, Protection of Wetlands. Clean Water Act of 1977 (42 U.S.C. 1857th-7, et.seq.)	No net loss.
Wild and scenic rivers	Wild & Scenic Rivers Act, as amended (16 U.S.C. 1271 et. seq.)	Not present in area.

APPENDIX F

Little Otter Creek Watershed Map



Little Otter Creek - Reservoir LO-1 Watershed Map

April 2002

- Little Otter Creek Watershed Boundary
- Proposed Dam
- Top of Dam Elevation
- Permanent Pool



Caldwell County,
Missouri

